

FIG. 1B.

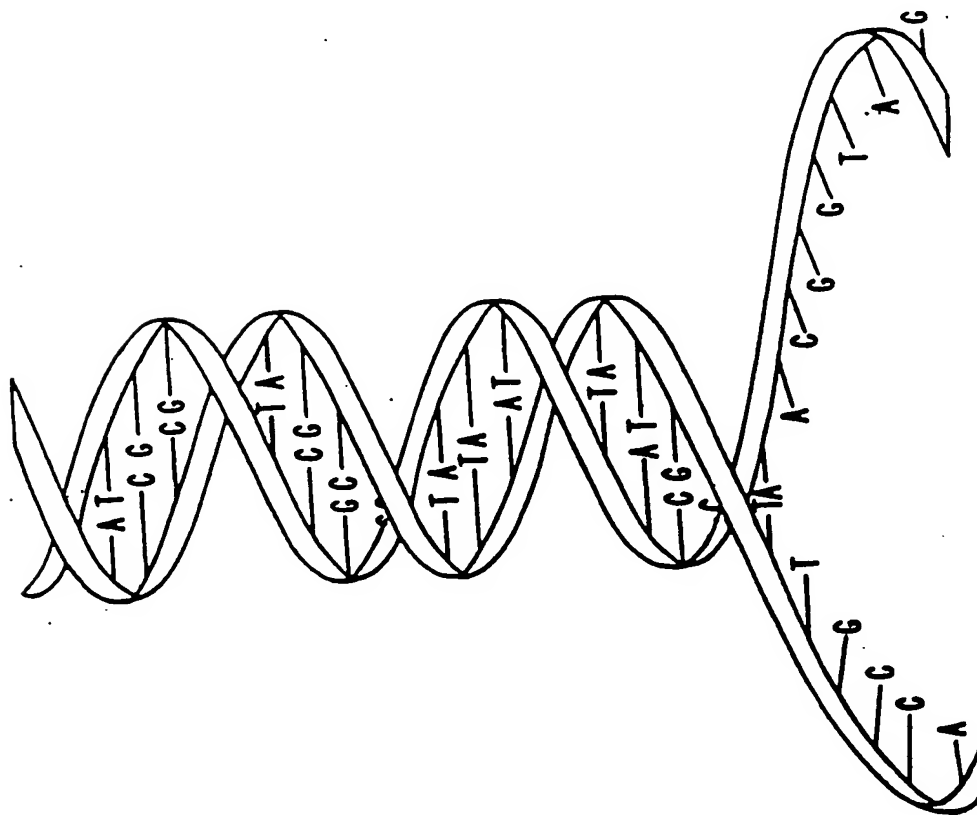
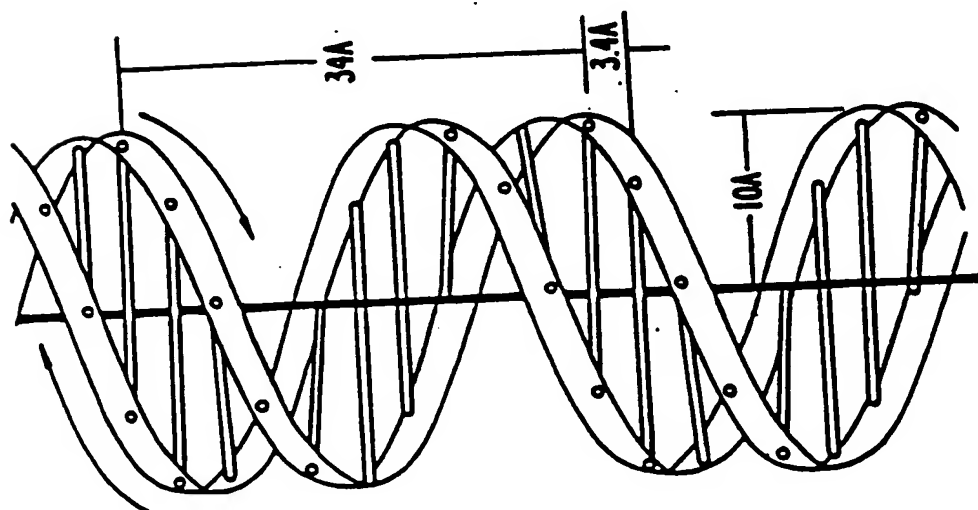


FIG. 1A.



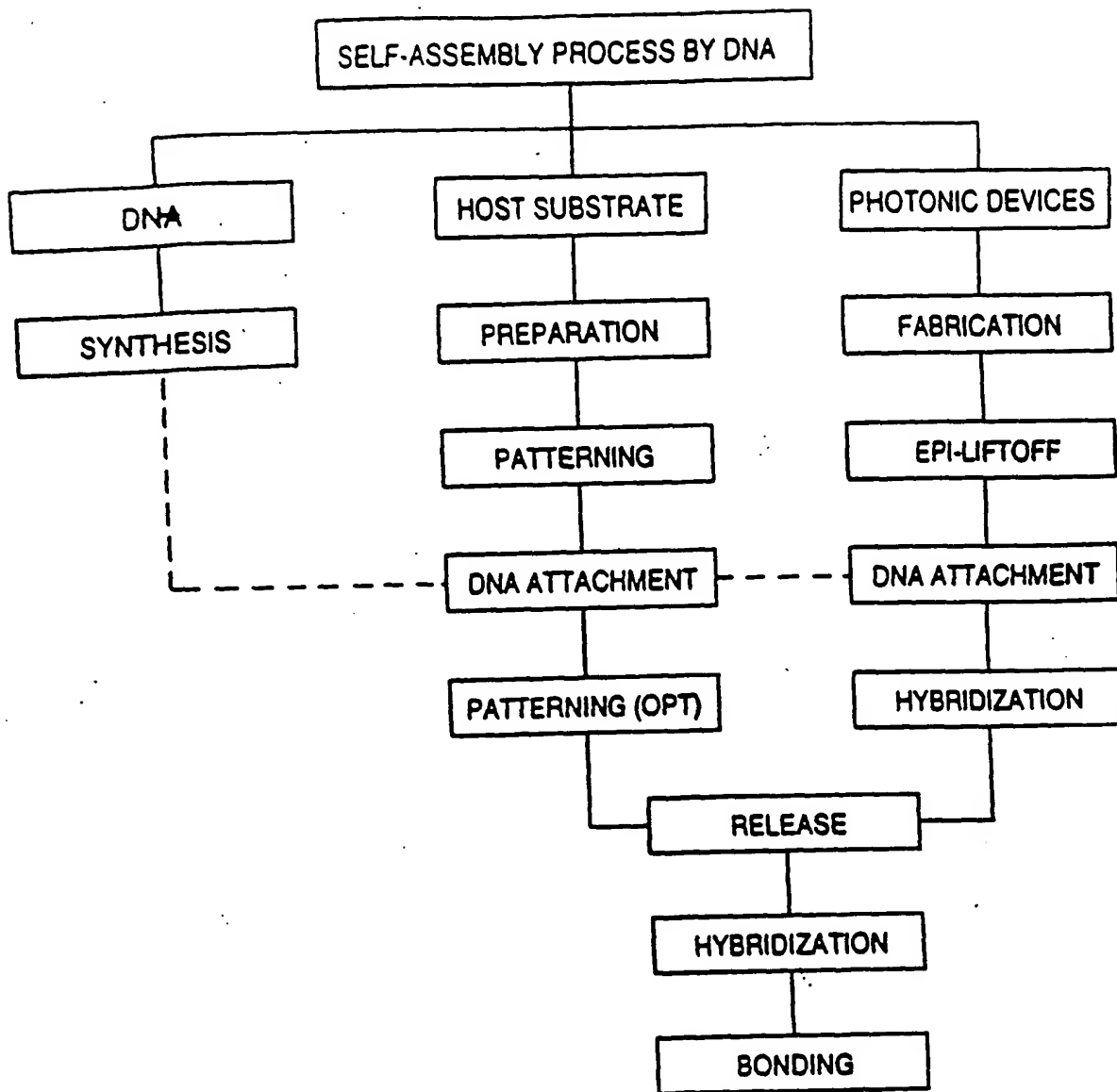


FIG. 2.

FIG. 3B.

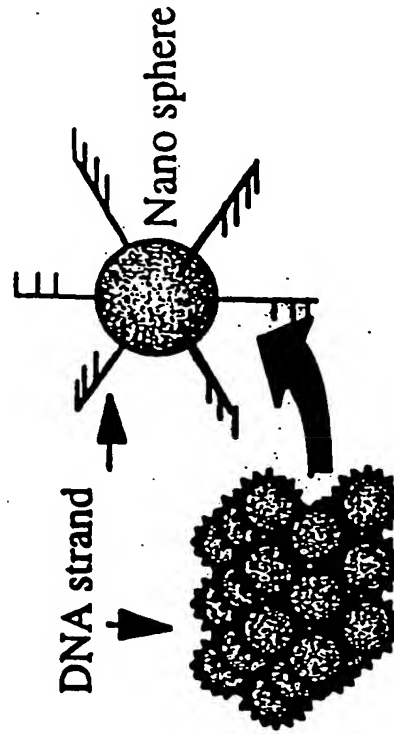
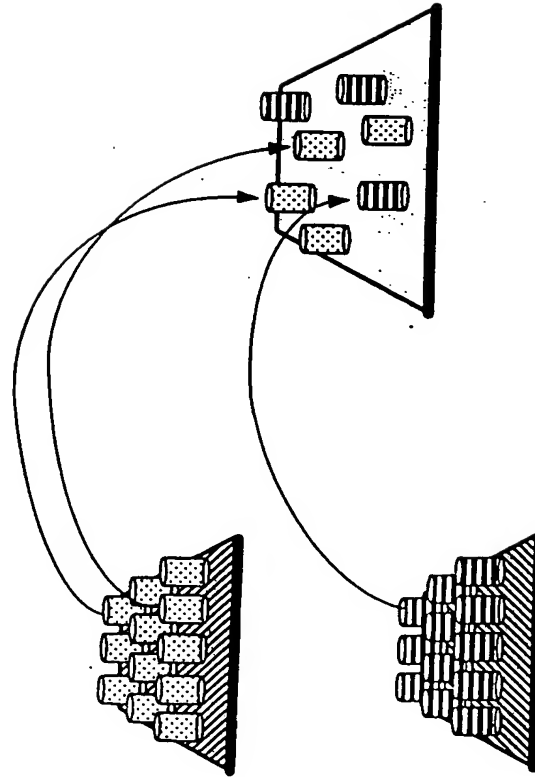


FIG. 3A.



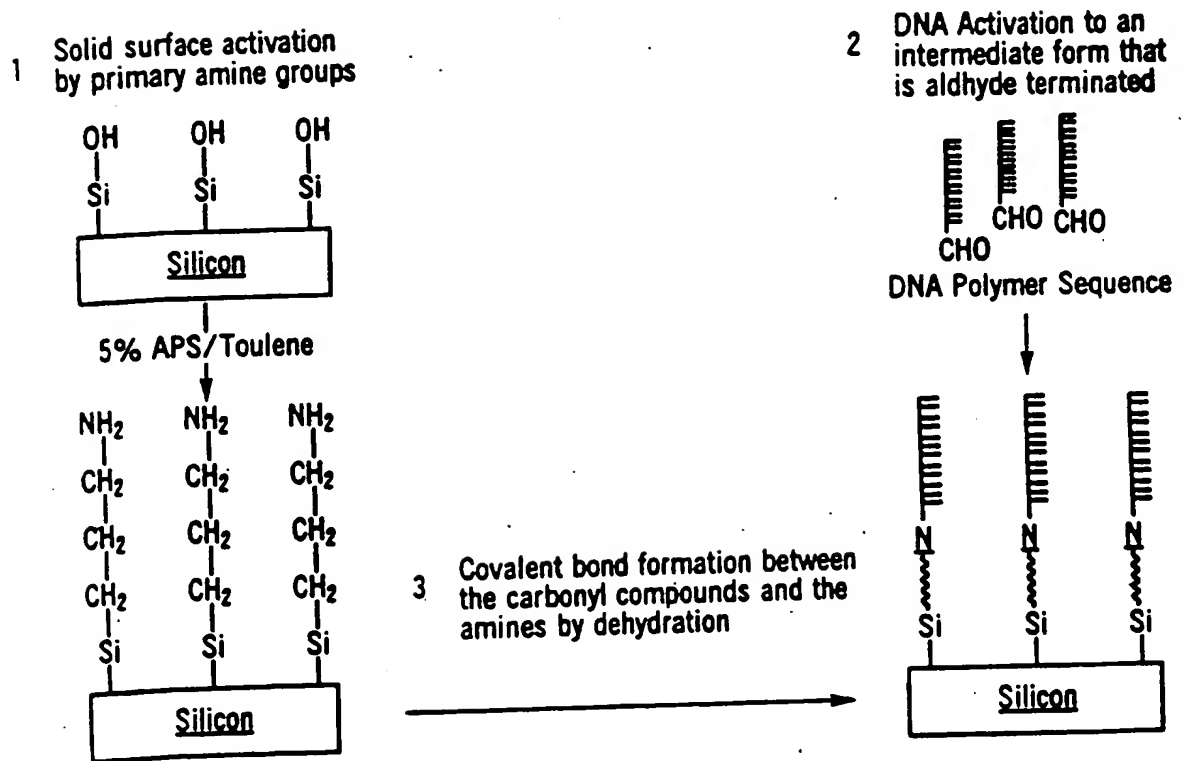
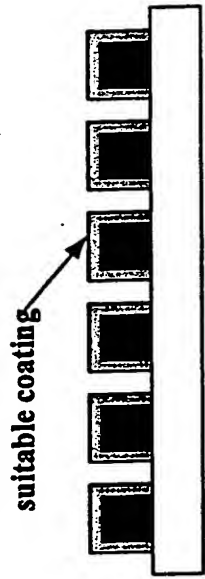


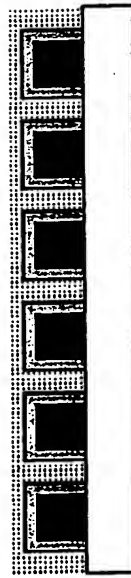
FIG. 4.

1. Standard micro/nano device fab. with sacrificial layer for liftoff

2. Suitable coating of device surface for quasi-Brownian motion capability



3. Support with polyimide or black wax



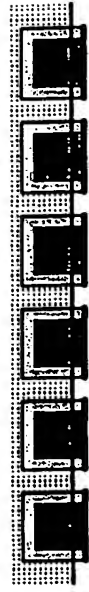
4. Epi-liftoff



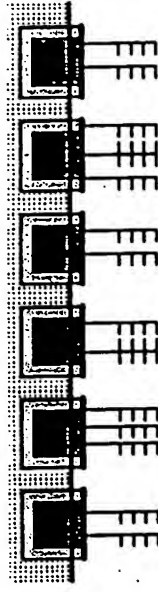
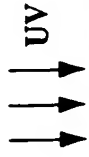
5. Polyimide recess



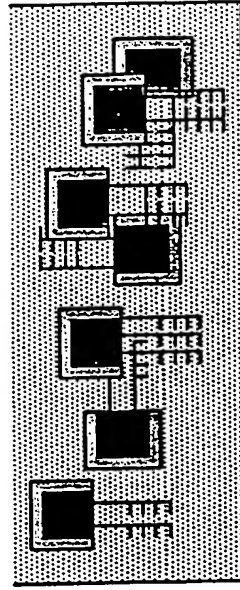
6. Metalization



7. DNA Attachment



8. Release



Hybridization with complement

Fig. 5

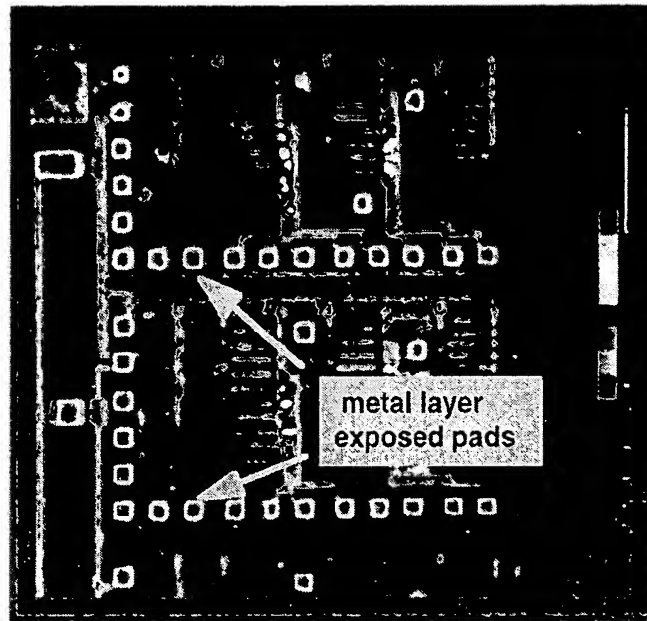


Fig. 6

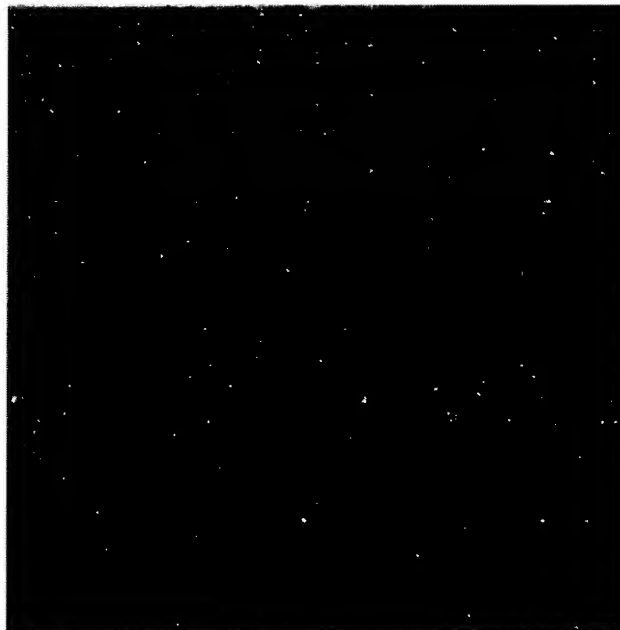


Fig. 7



Fig. 8A

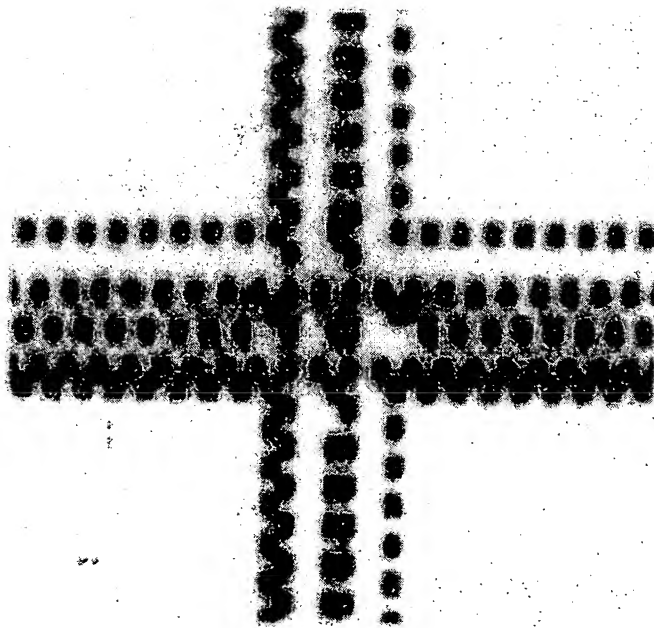


Fig. 8B

FIG. 9

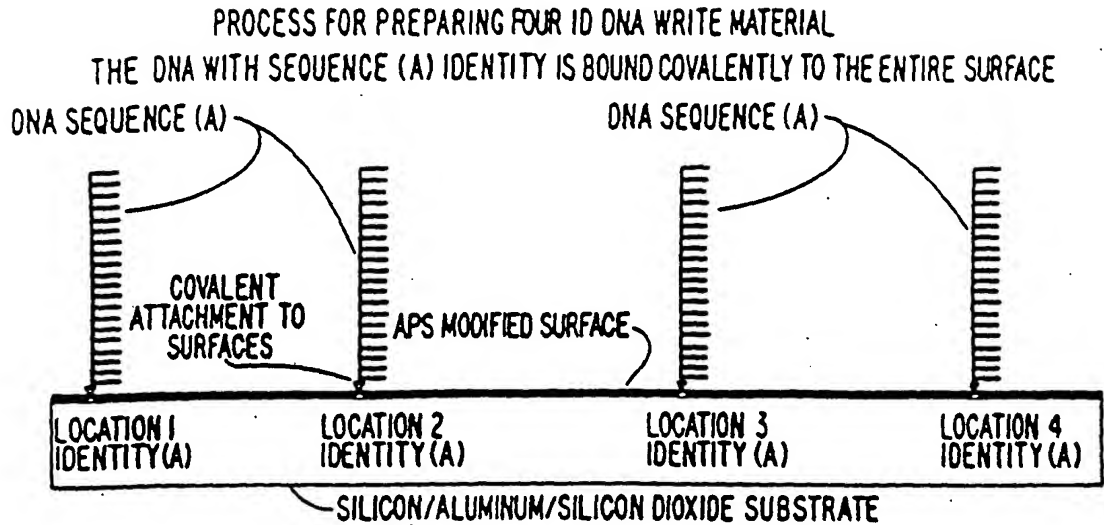


FIG. 10

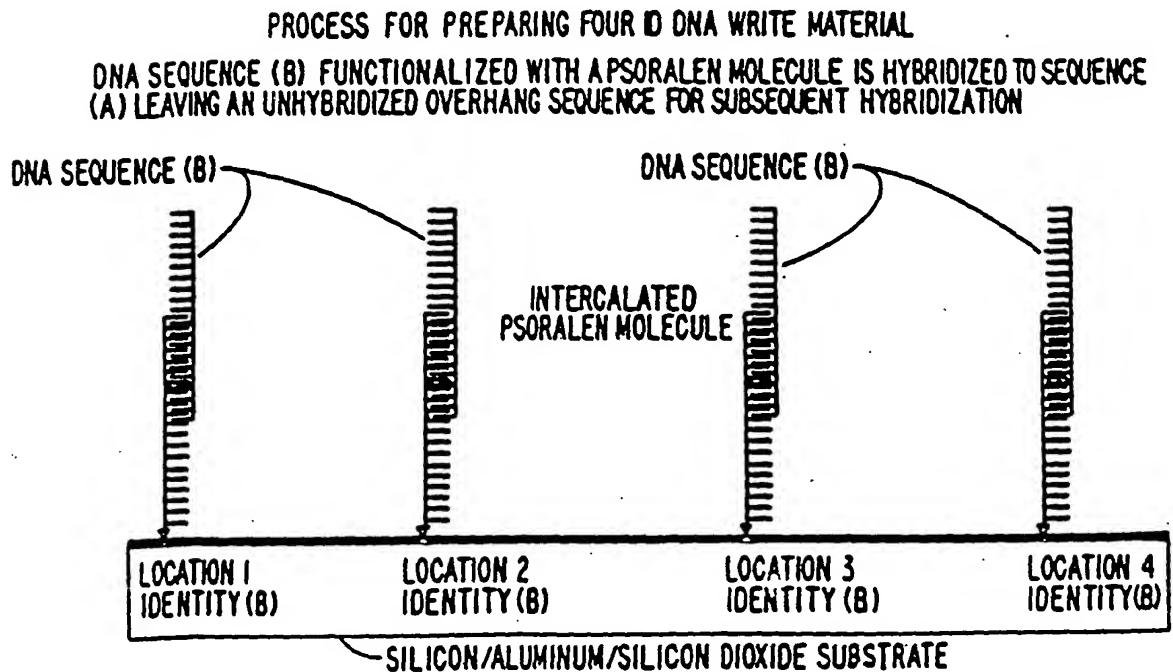


FIG. 11

LOCATION #1 IS MASKED FROM UV EXPOSURE WHILE LOCATIONS 2,3 & 4 ARE EXPOSED
 ALLOWING THE PSORALEN MOLECULES TO COVALENTLY CROSS-LINK THE (A) AND (B)
 DNA SEQUENCE.

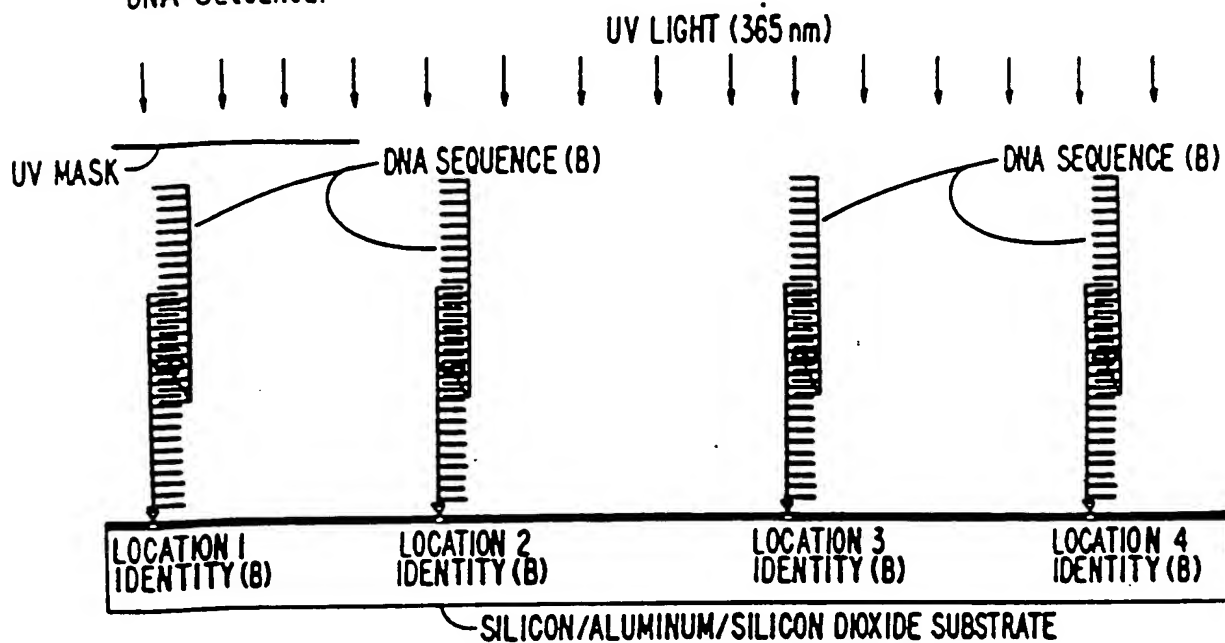


FIG. 12

PROCESS FOR PREPARING FOUR ID DNA WRITE MATERIAL

DEHYBRIDIZATION IS CARRIED OUT TO REMOVE THE NON-CROSSLINKED SEQUENCE (B) FROM THE
 1st LOCATION, WHICH NOW HAS A PERMANENT (A) SEQUENCE IDENTITY. DNA SEQUENCE (B) IS
 NOW COVALENTLY COUPLED TO LOCATIONS 2, 3 AND 4

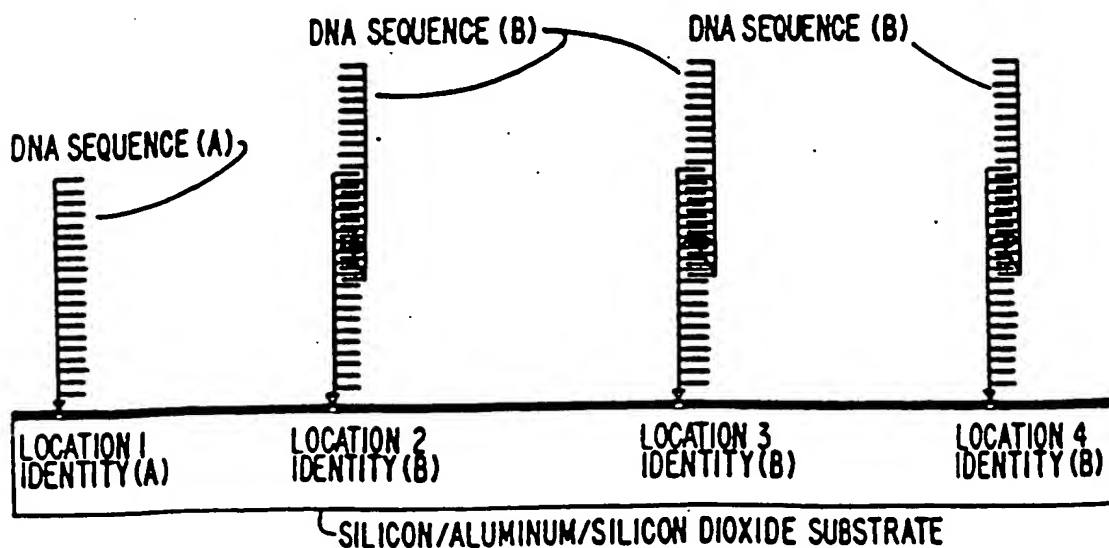


FIG. 13.

PROCESS FOR PREPARING FOUR ID DNA WRITE MATERIAL

A PSORALEN FUNCTIONALIZED DNA SEQUENCE (C) IS NOW HYBRIDIZED TO SEQUENCE (B),
AND THE PROCESS IS REPEATED.

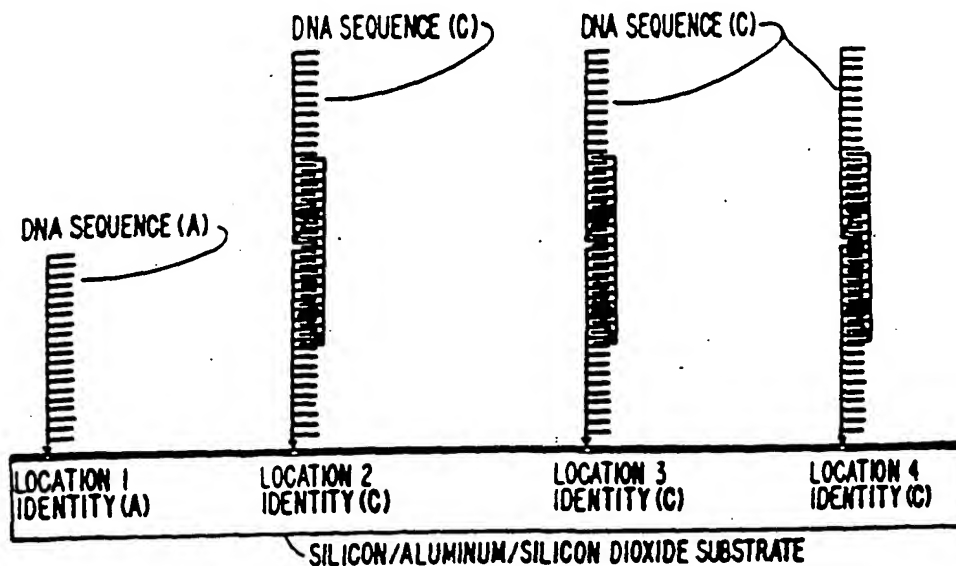


FIG. 14.

PROCESS FOR PREPARING FOUR ID DNA WRITE MATERIAL

LOCATIONS 1 AND 2 ARE NOW MASKED WHILE LOCATIONS 3 AND 4 ARE EXPOSED AFFECTING
THE COVALENT CROSS-LINKING OF SEQUENCES (B) AND (C).

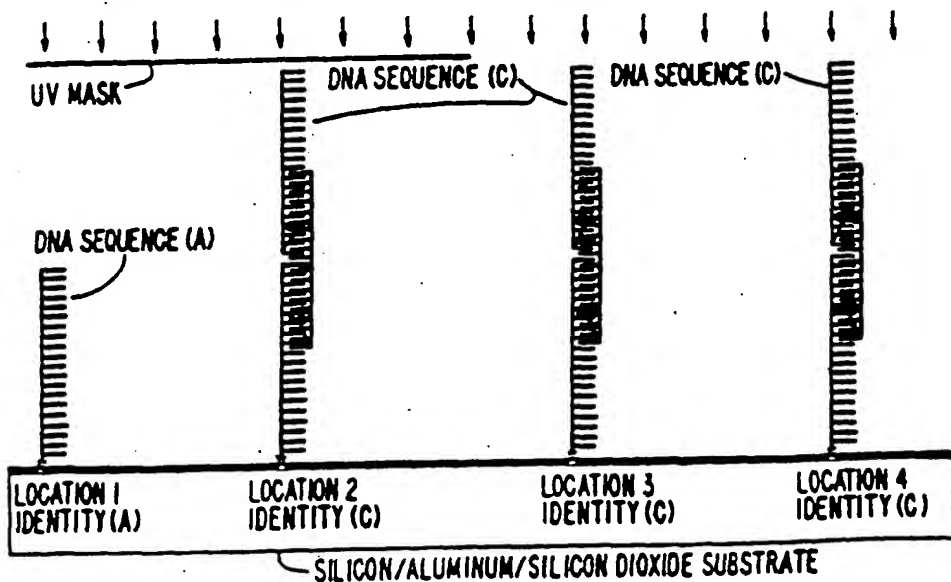


FIG. 15

PROCESS FOR PREPARING FOUR ID DNA WRITE MATERIAL

DEHYBRIDIZATION IS CARRIED OUT TO REMOVE SEQUENCE (C) FROM LOCATION 2.
A PERMANENT (B) DNA SEQUENCE IDENTITY IS NOW PRESENT AT LOCATION 2

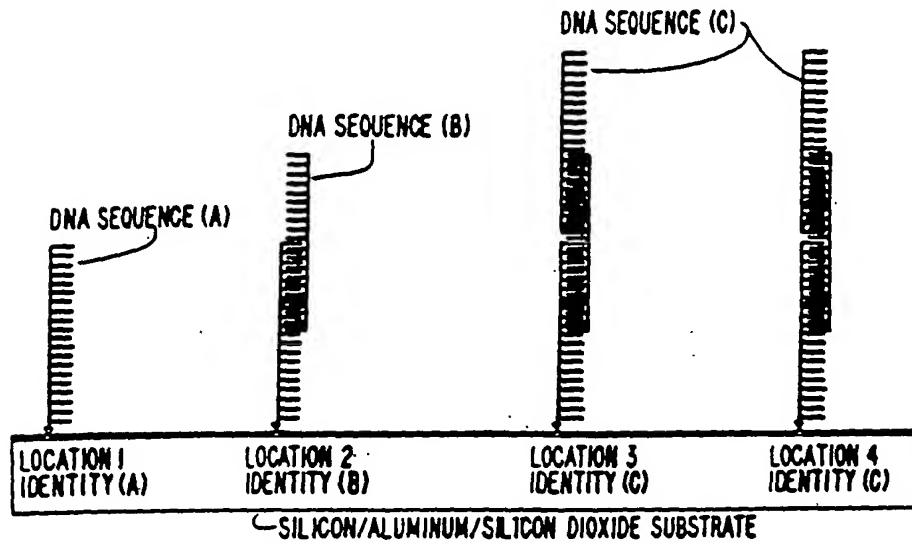


FIG. 16

PROCESS FOR PREPARING FOUR ID DNA WRITE MATERIAL

A PSORALEN FUNCTIONALIZED DNA SEQUENCE (D)
IS NOW HYBRIDIZED TO SEQUENCE (C), AND THE
PROCESS IS REPEATED.

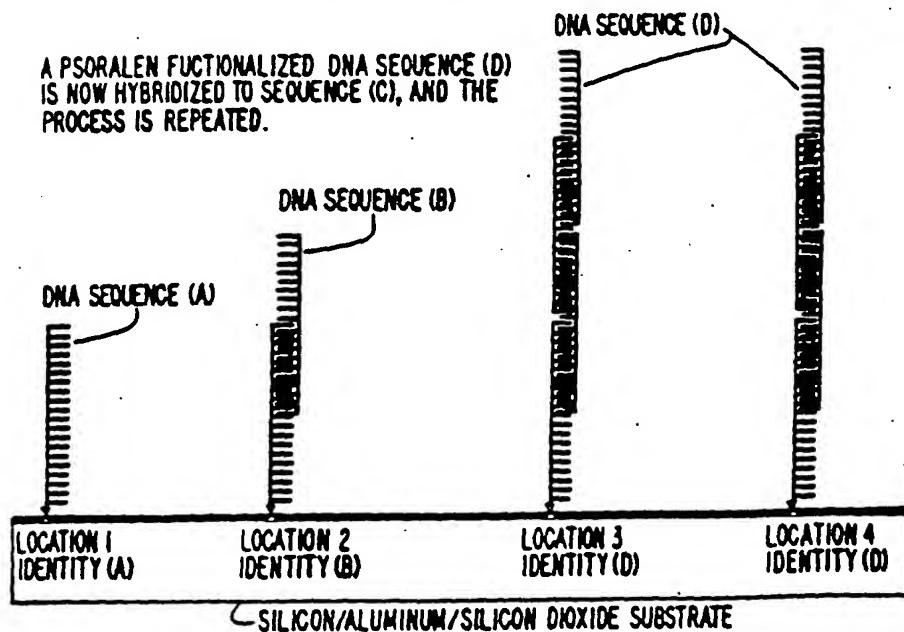


FIG. 17

PROCESS FOR PREPARING FOUR ID DNA WRITE MATERIAL

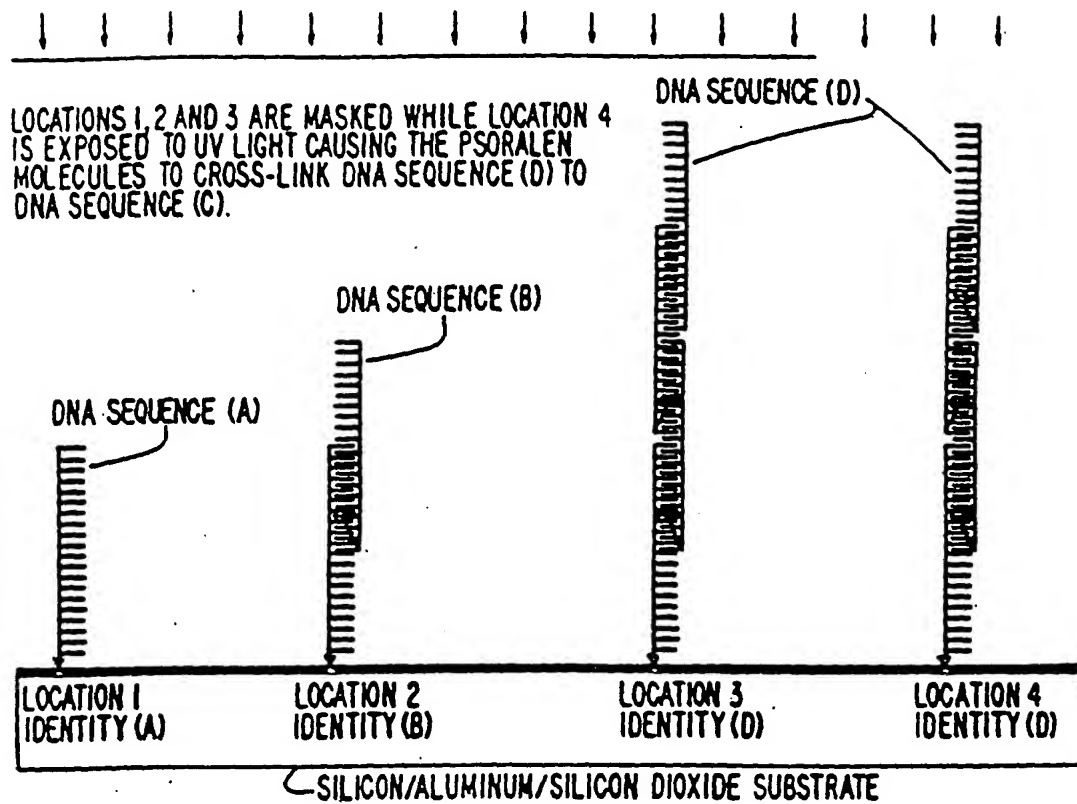


FIG. 18

PROCESS FOR PREPARING FOUR ID DNA WRITE MATERIAL

DEHYBRIDIZATION IS CARRIED OUT TO REMOVE DNA SEQUENCE (D) FROM LOCATION 3. A PERMANENT (C) IDENTITY IS PRESENT AT LOCATION 3 AND A PERMANENT (D) IDENTITY IS PRESENT AT LOCATION 4. THIS COMPLETES THE PROCESS FOR PREPARING A FOUR ID DNA WRITE MATERIAL.

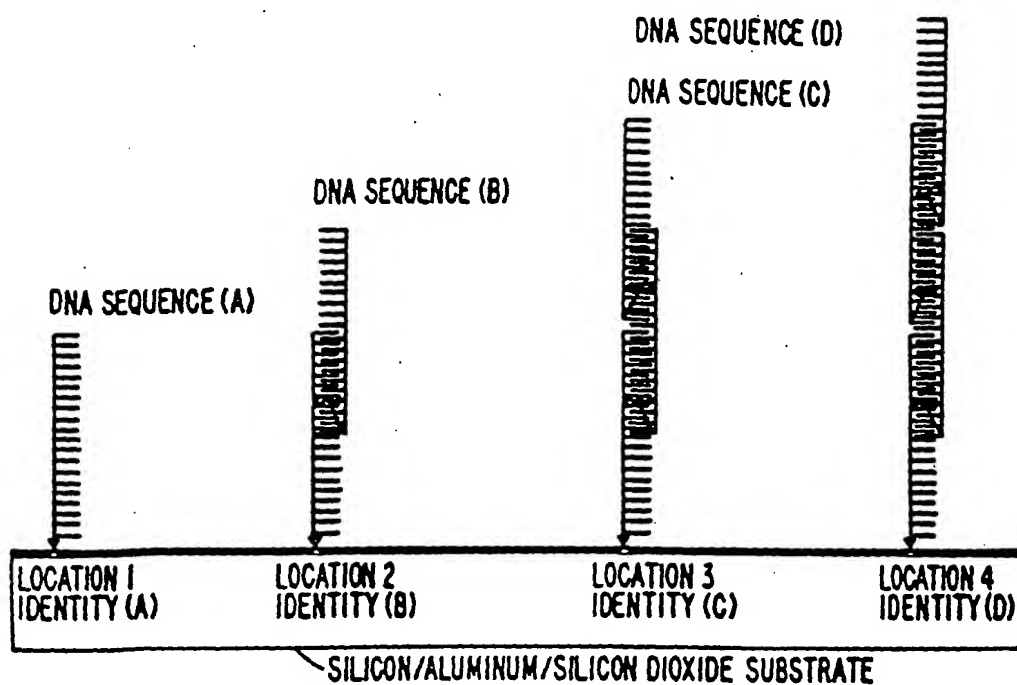


FIG. 19

PROCESS FOR PREPARING FOUR ID DNA WRITE MATERIAL

COMPLEMENTARY DNA SEQUENCES TO (A), (B), (C), (D)
IDENTITIES LABELED WITH FOUR RESPECTIVE FLUORESCENT
DYES CAN BE HYBRIDIZED TO DEMONSTRATE EACH IDENTITY

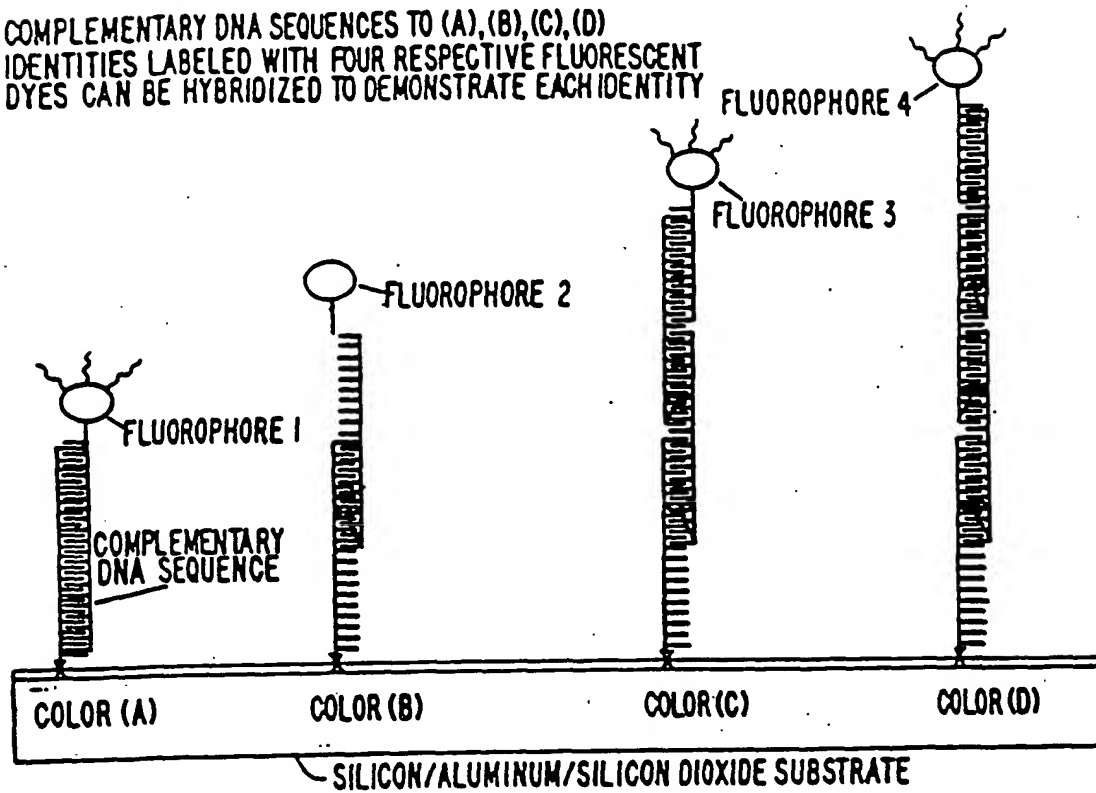


FIG. 20

PROCESS FOR WRITING TO FOUR ID DNA WRITE MATERIAL

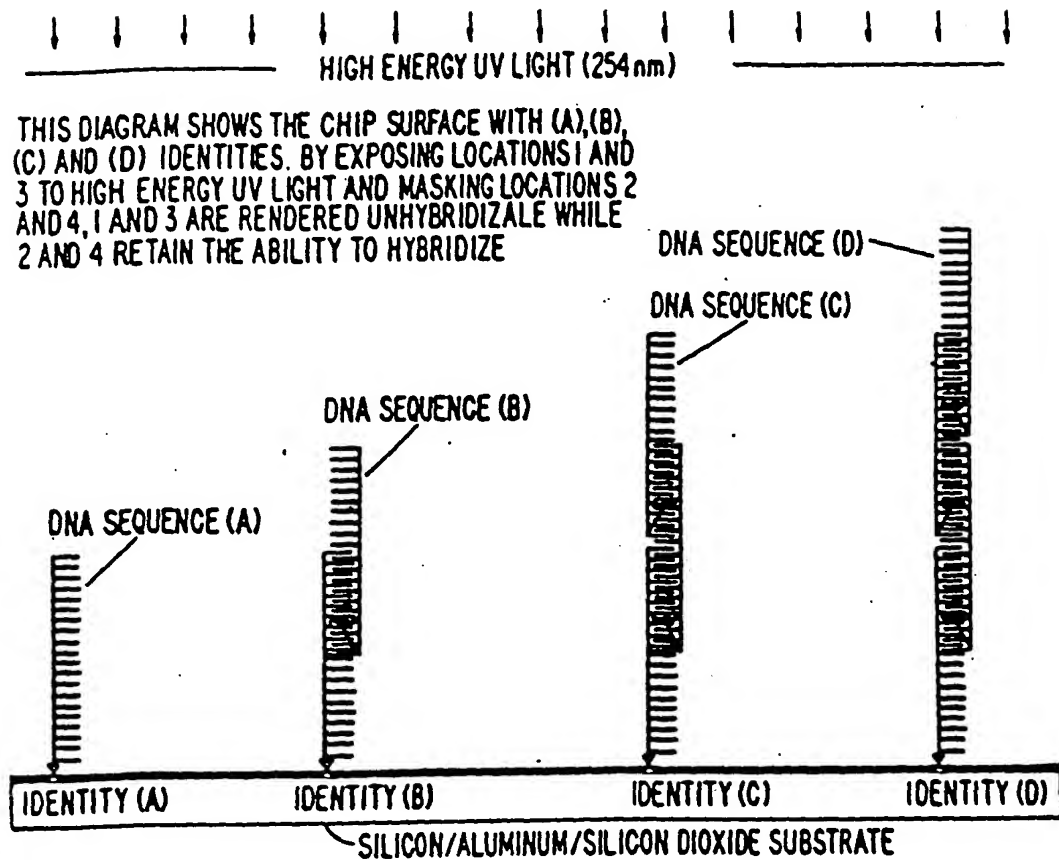


FIG. 21

PROCESS FOR WRITING TO FOUR ID DNA WRITE MATERIAL

SELECTIVE UV EXPOSURE LEAVES LOCATIONS 1 AND 3 UNHYBRIDIZABLE
AND LOCATIONS 2 AND 4 RETAIN THE ABILITY TO HYBRIDIZE

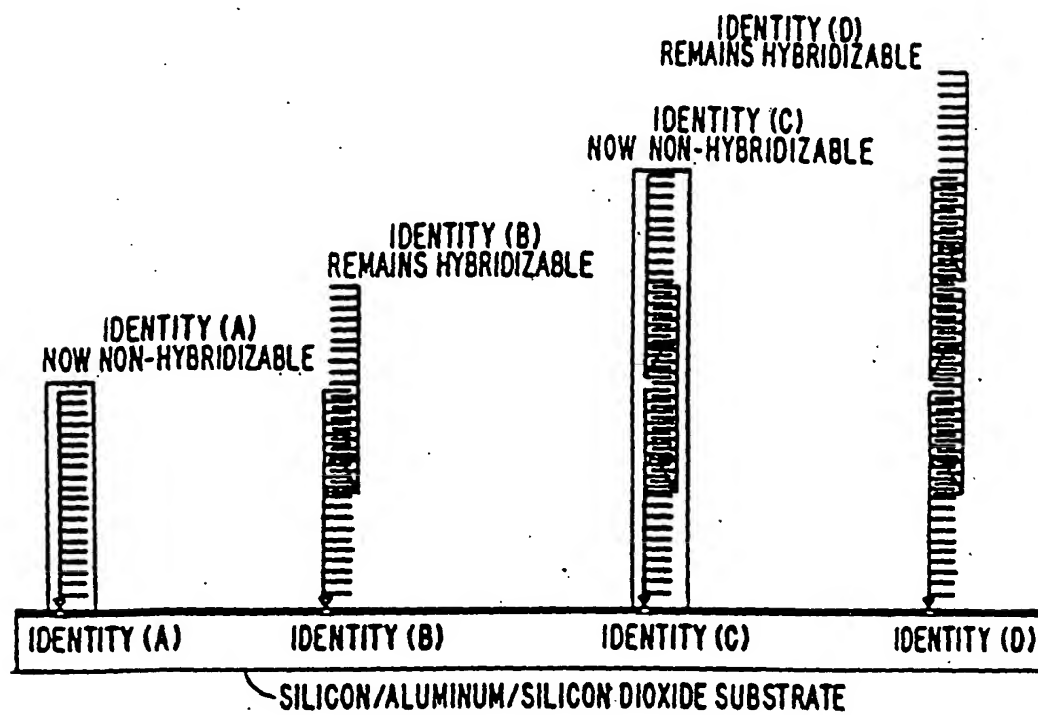
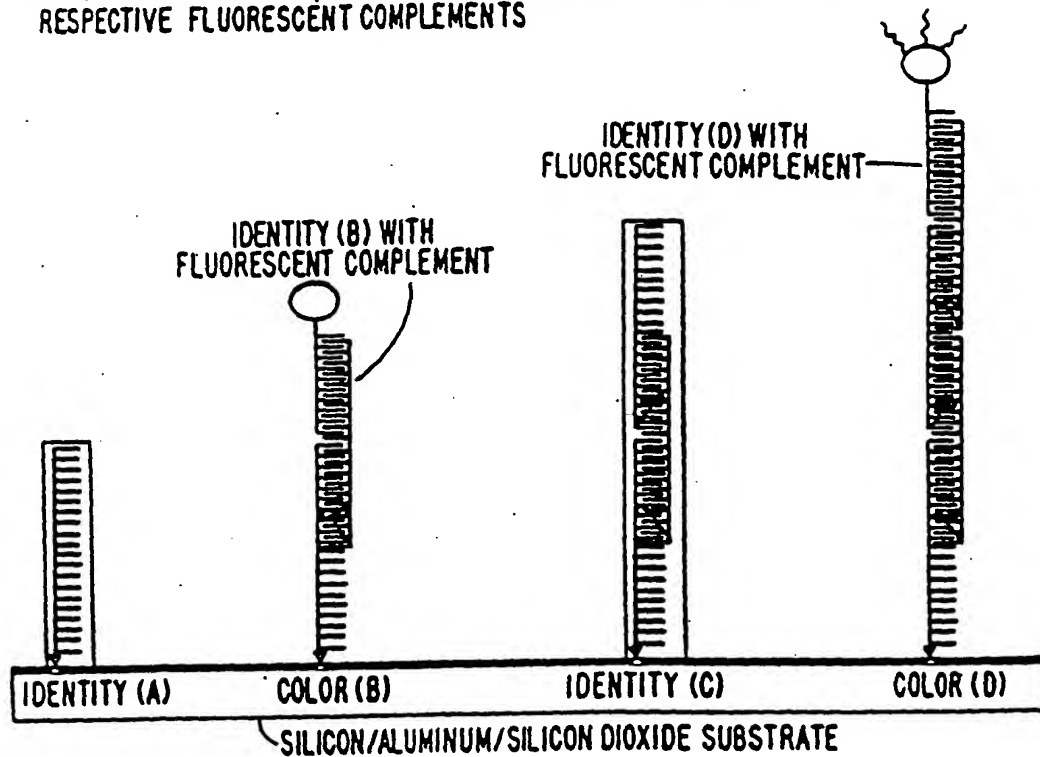


FIG. 22.

PROCESS FOR WRITING TO FOUR ID DNA WRITE MATERIAL

ALL 4 DNA COMPLEMENTS LABELED WITH THEIR RESPECTIVE FLUORPHORES ARE
APPLIED TO THE SURFACE, ONLY LOCATIONS (B) AND (D) HYBRIDIZE THEIR
RESPECTIVE FLUORESCENT COMPLEMENTS



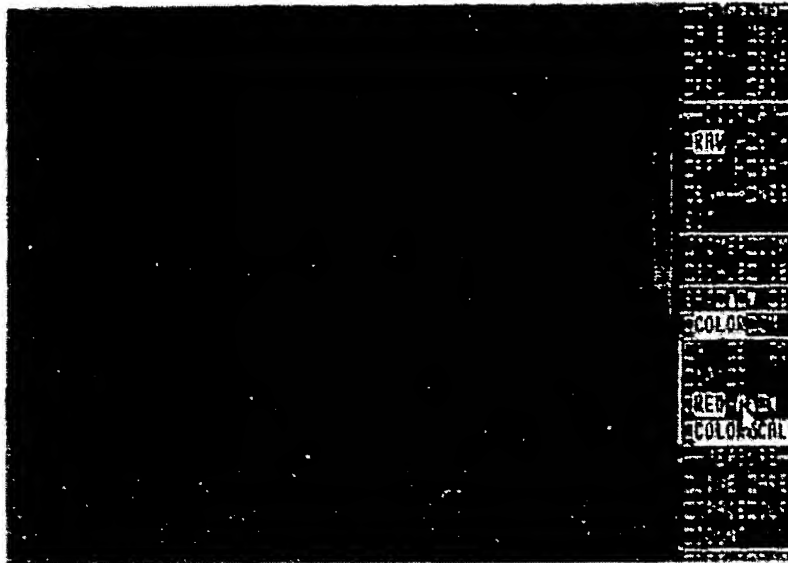


Fig. 23A

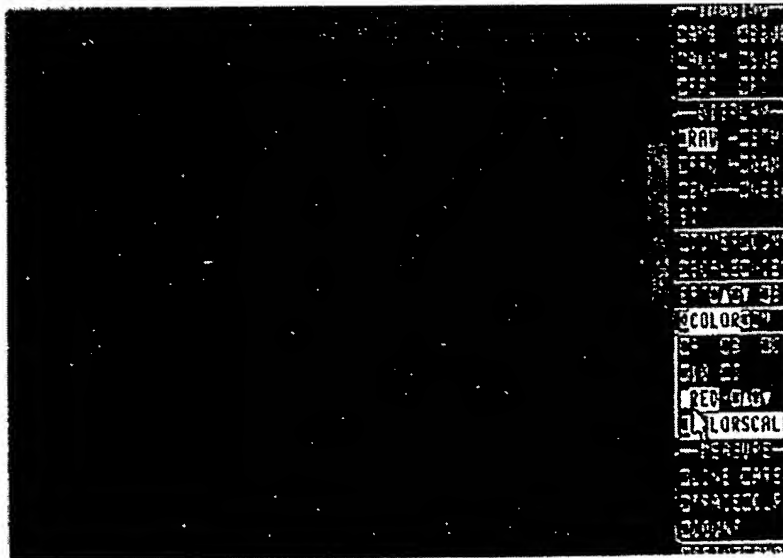


Fig. 23B

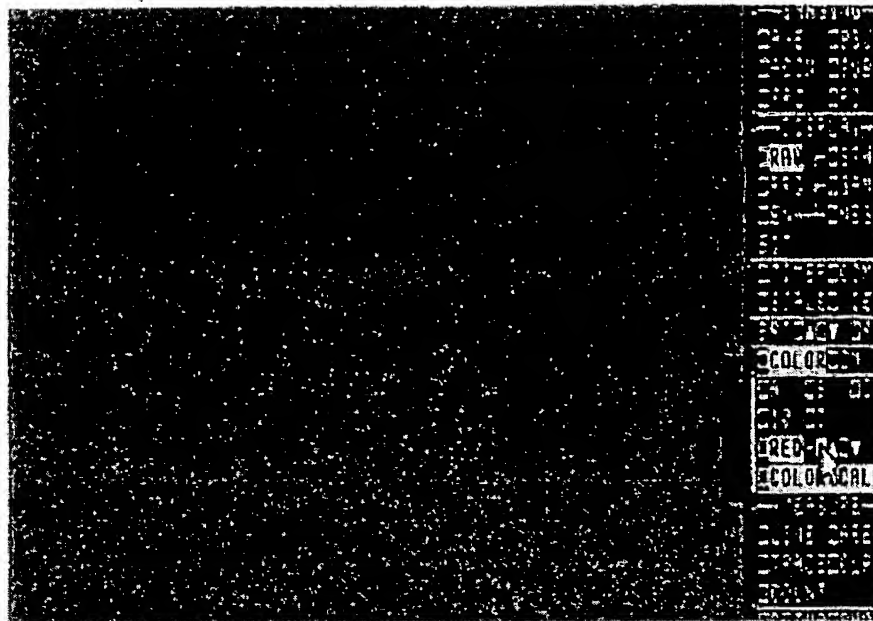
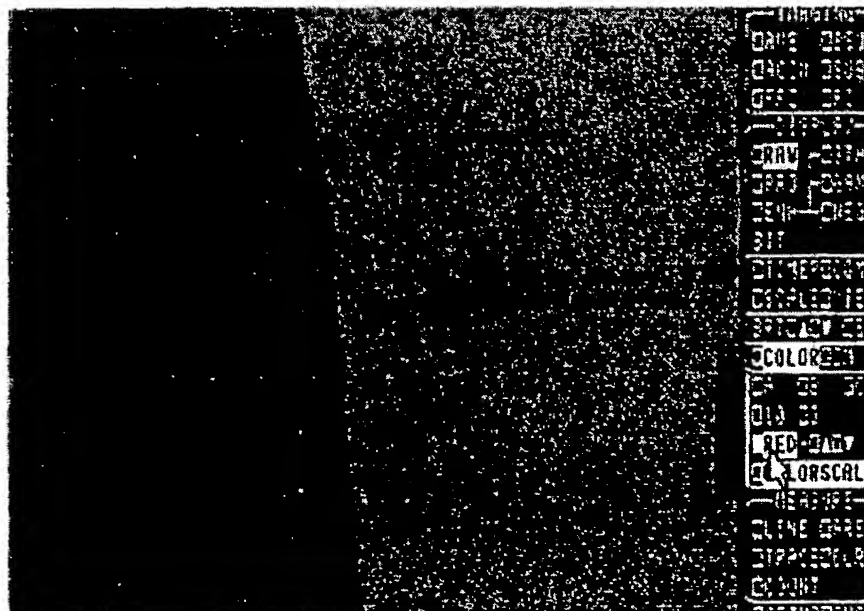


Fig. 24B



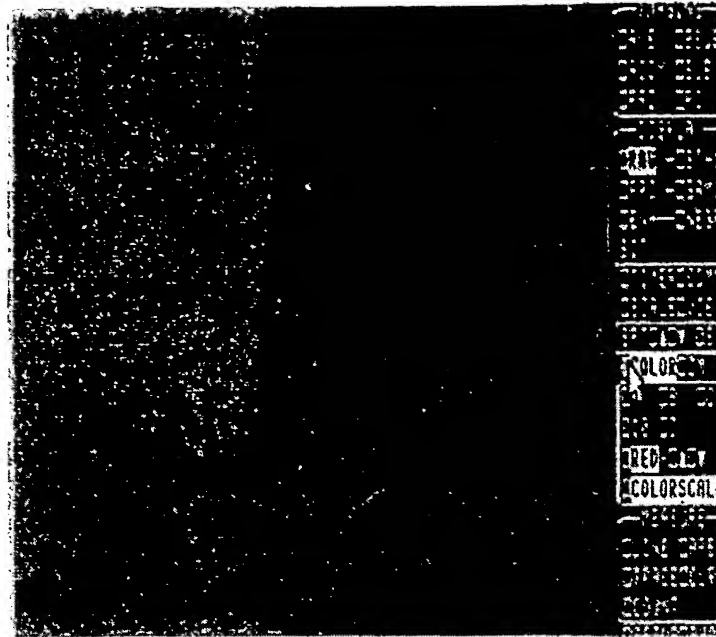


Fig. 25A

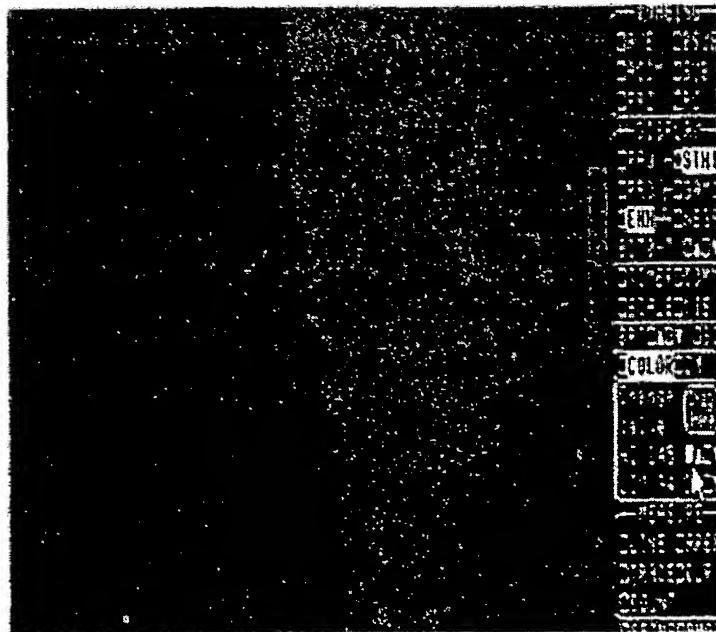


Fig. 25B

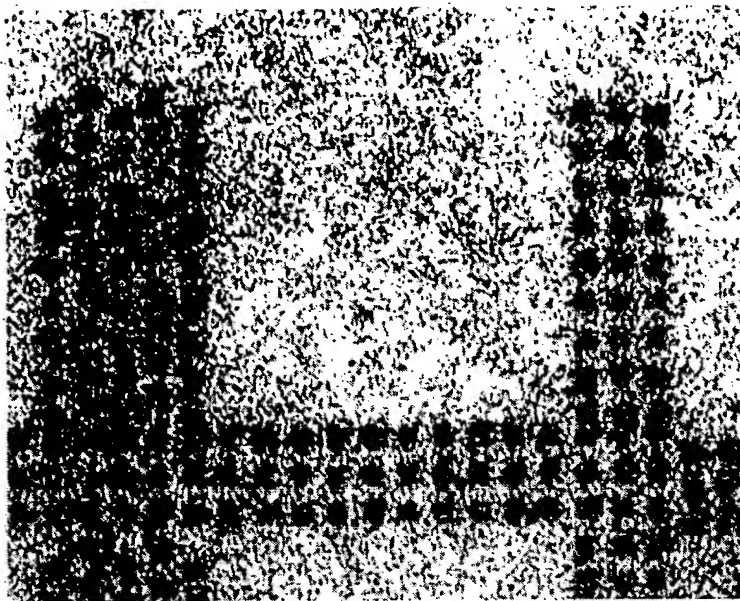


Fig. 26A

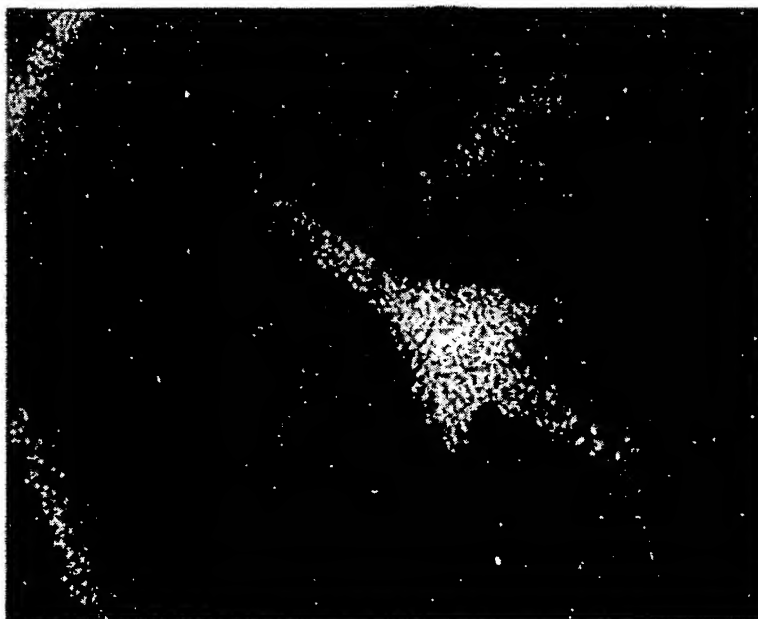


Fig. 26B

FIG. 27A

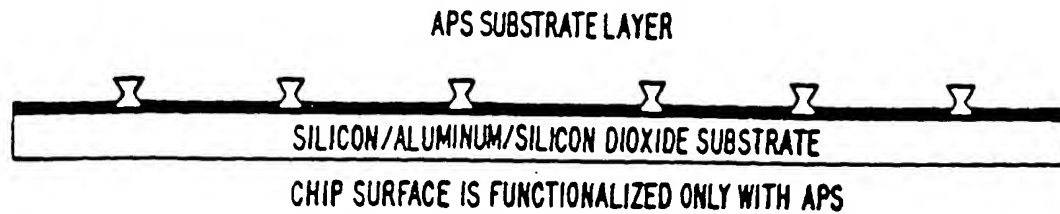


FIG. 27B

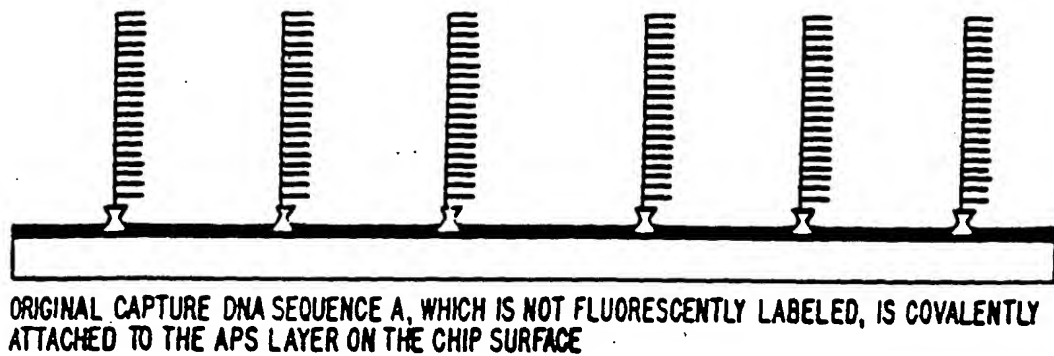


FIG. 27C

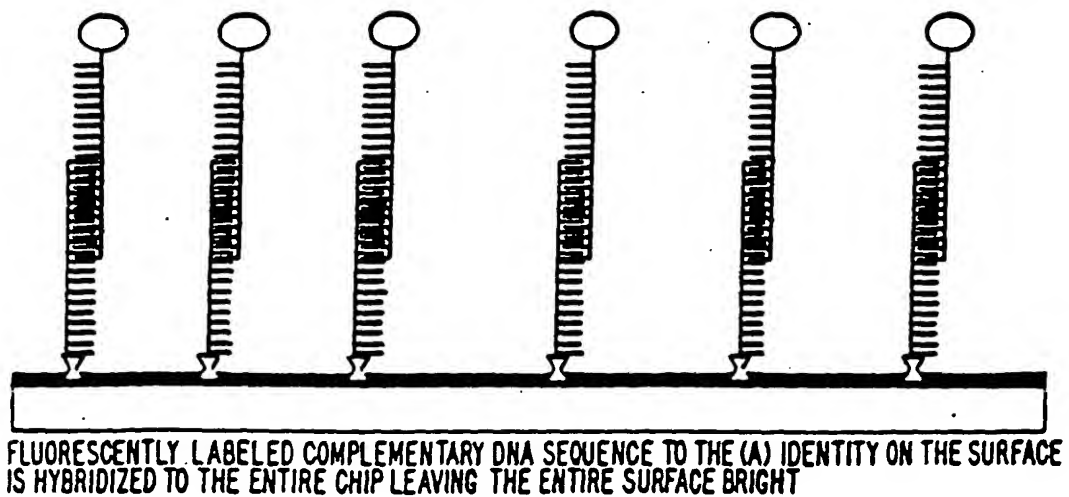


FIG. 28A

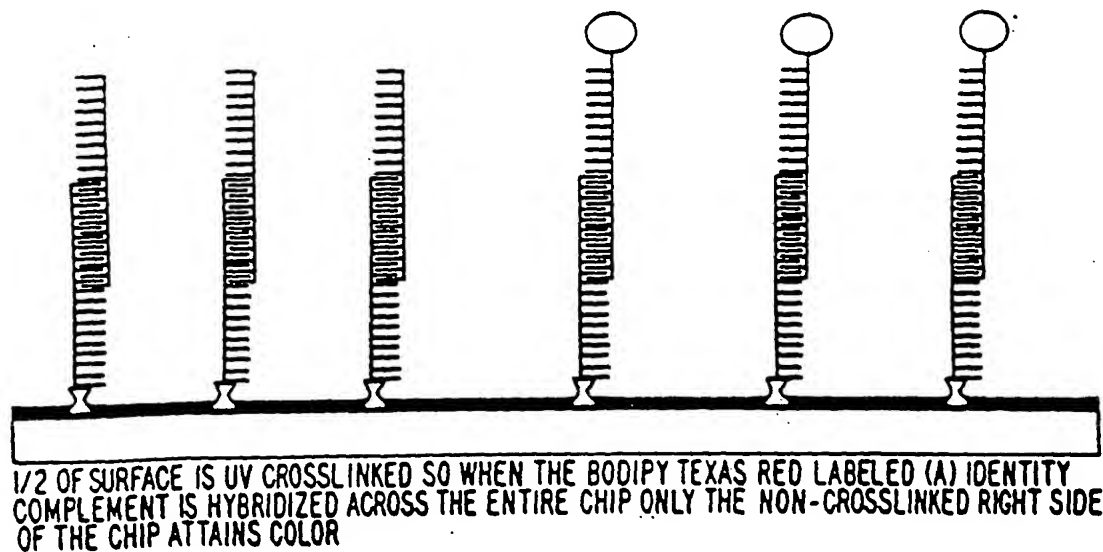


FIG. 28B

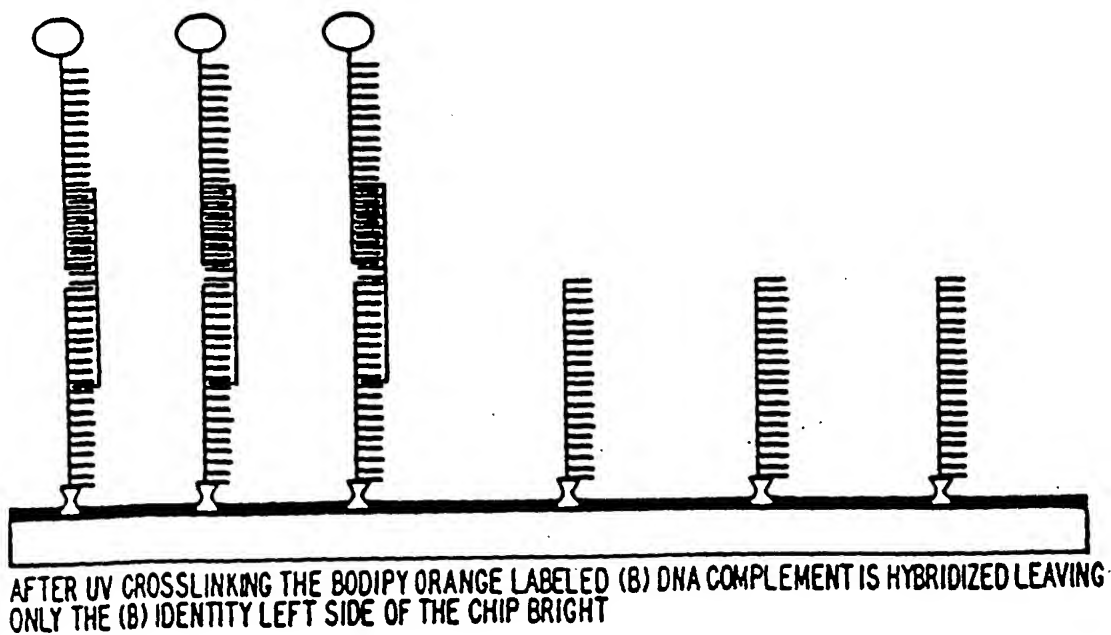
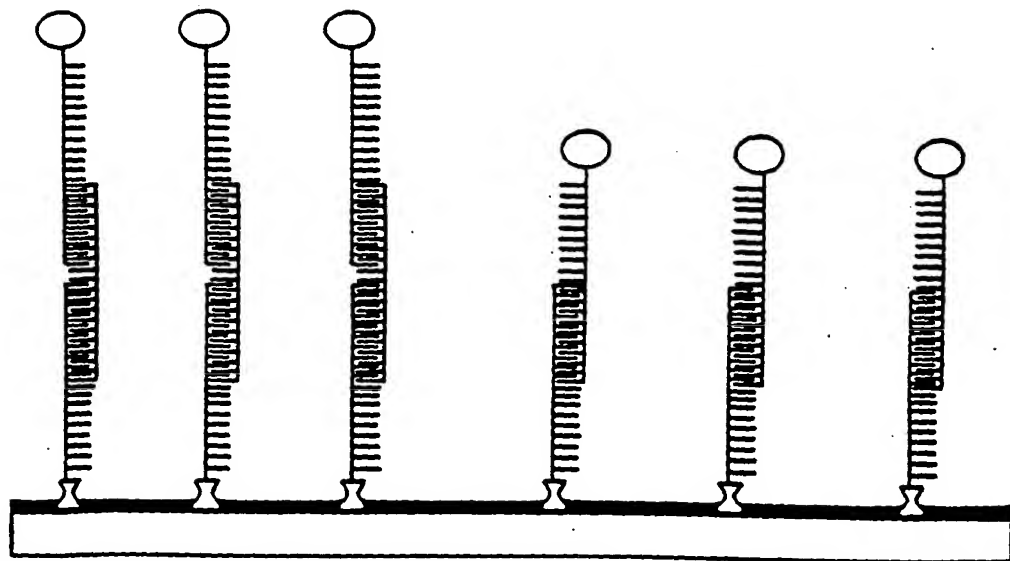


FIG. 28C



AFTER UV CROSSLINKING BOTH (A) AND (B) DNA COMPLEMENTS LABELED WITH THEIR RESPECTIVE FLUOROPHORES ARE HYBRIDIZED TO THE SURFACE, THE LEFT SIDE ATTAINING THE BOOPIY ORANGE AND THE RIGHT ATTAINING THE BOOPIY TEXAS RED COLOR.

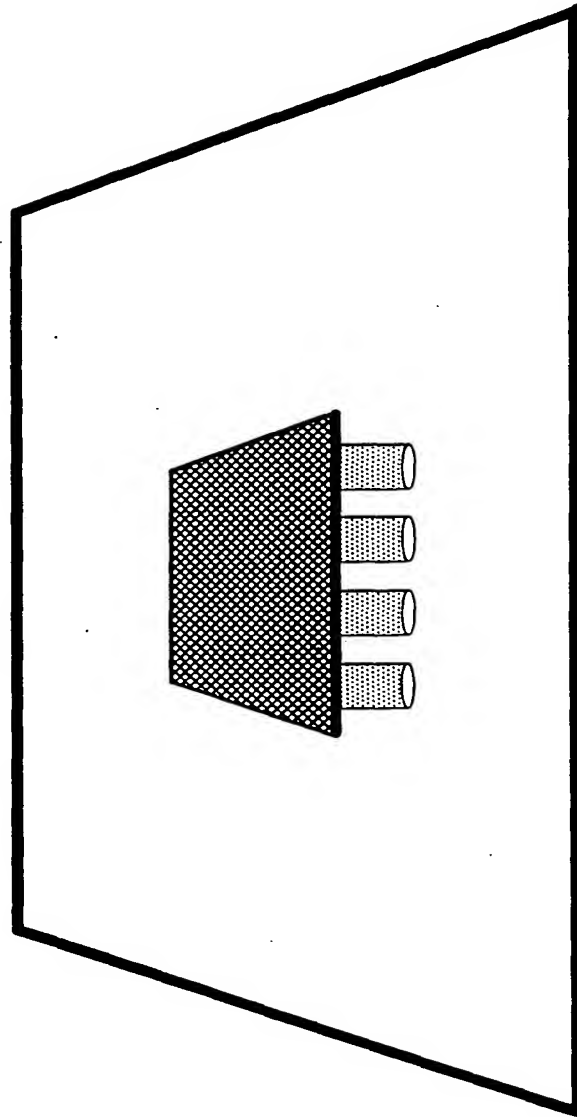


FIG. 29

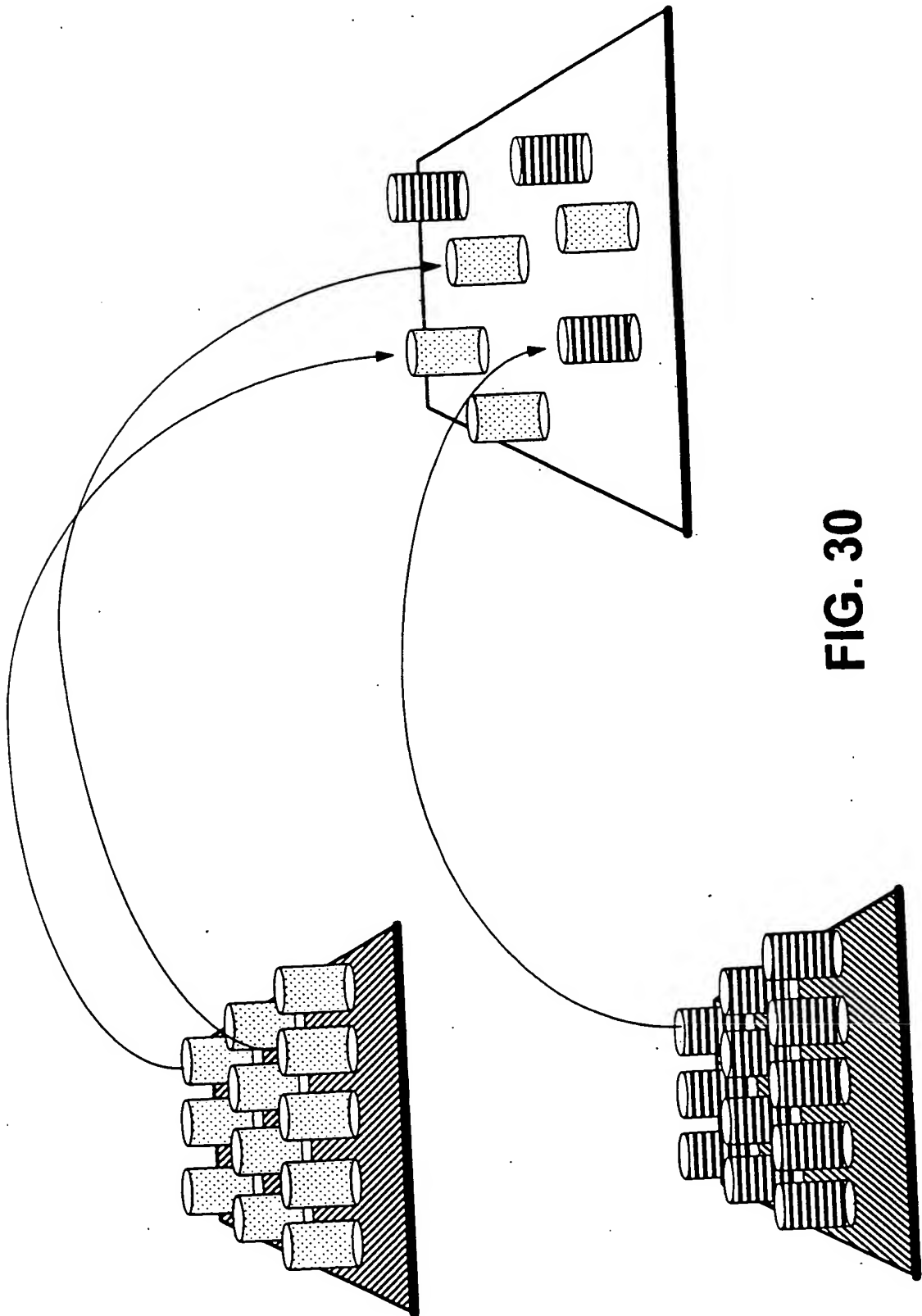


FIG. 30

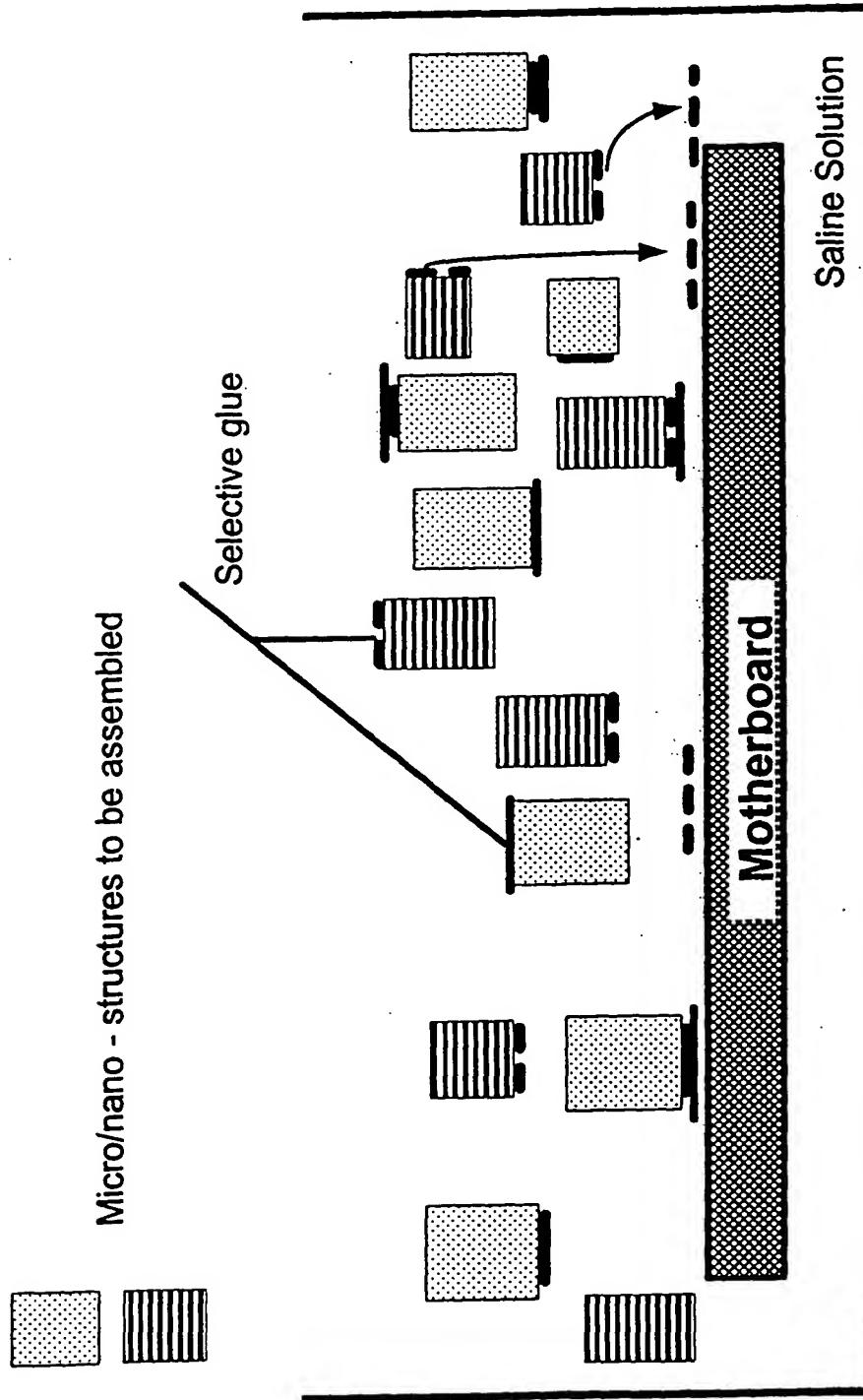


FIG. 31

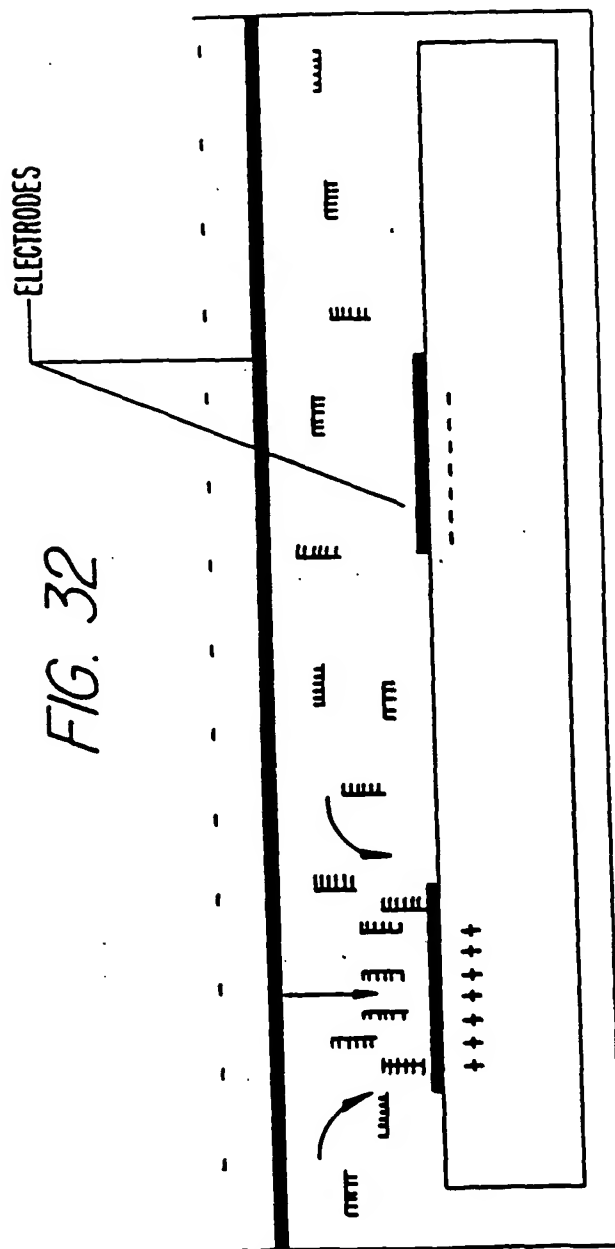


FIG. 33

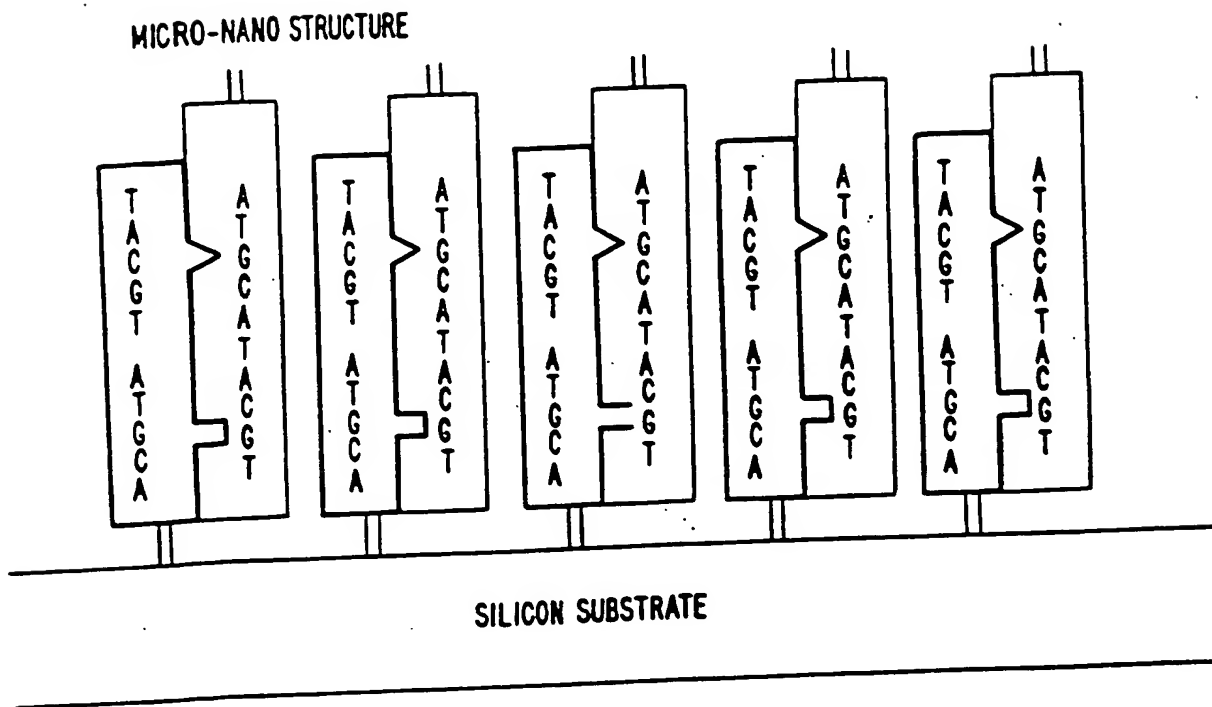


FIG. 34

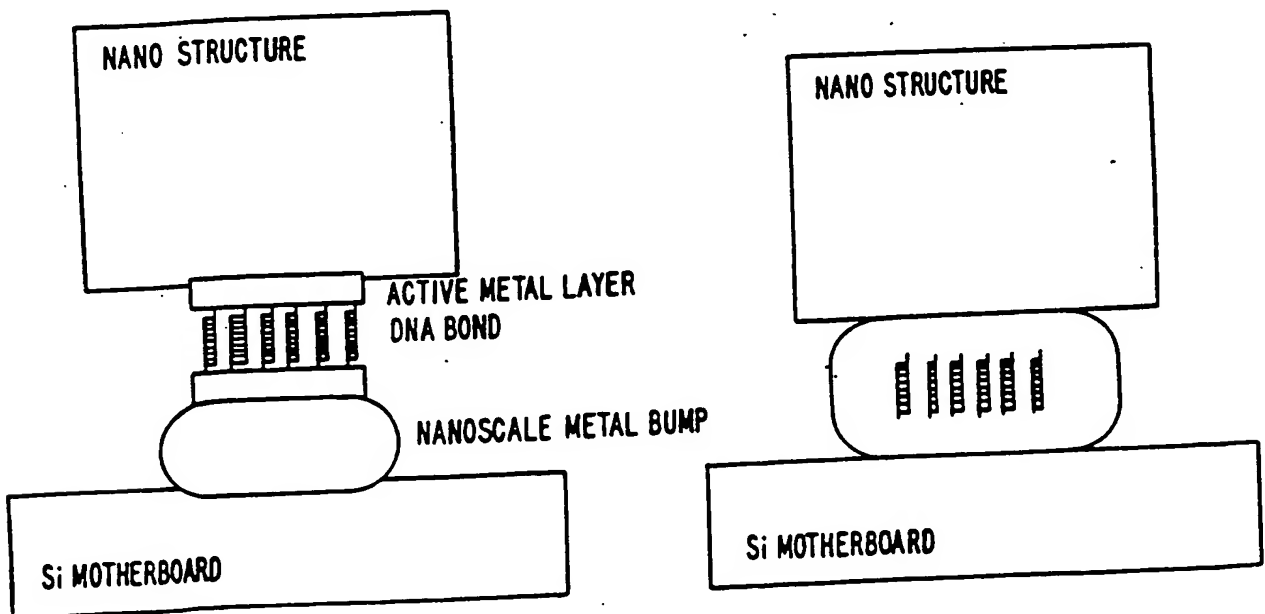
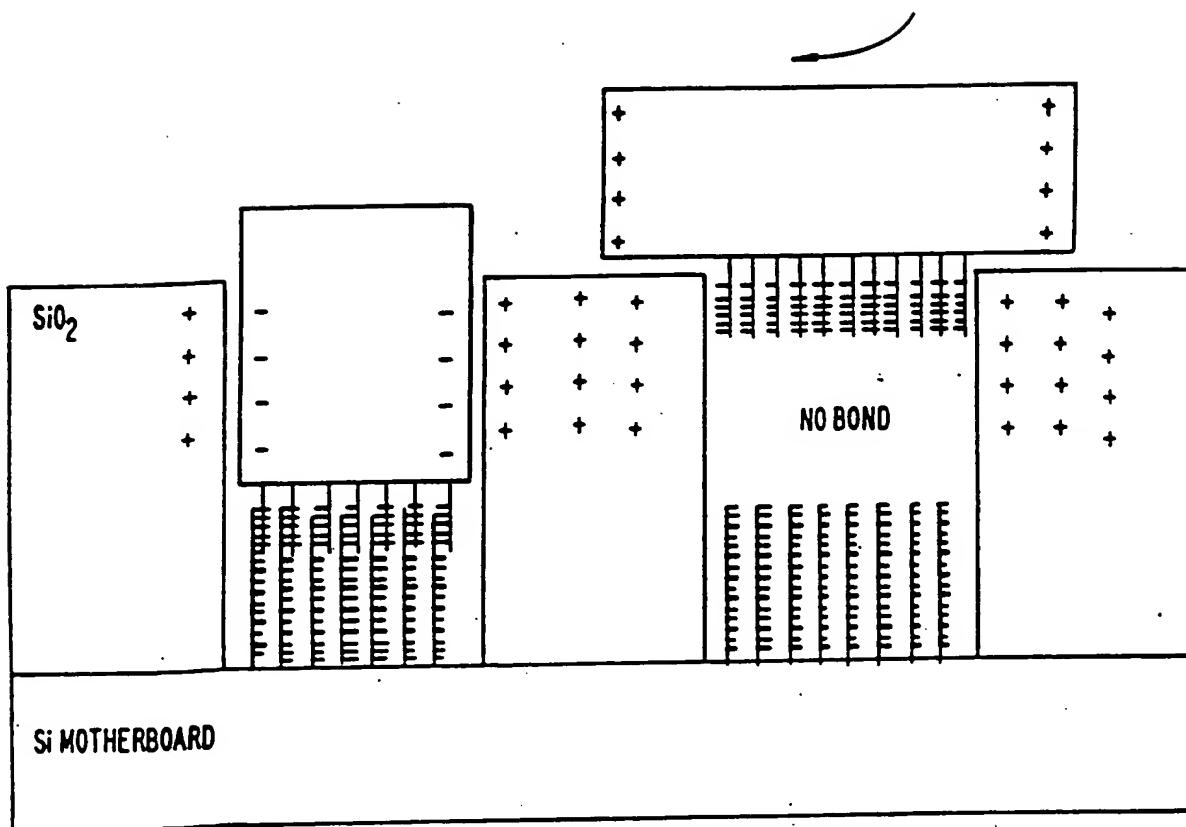
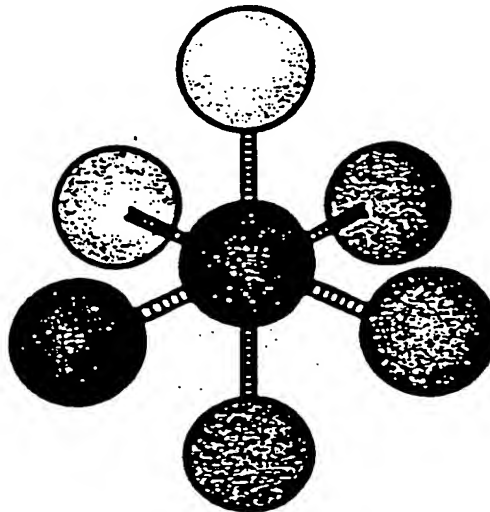
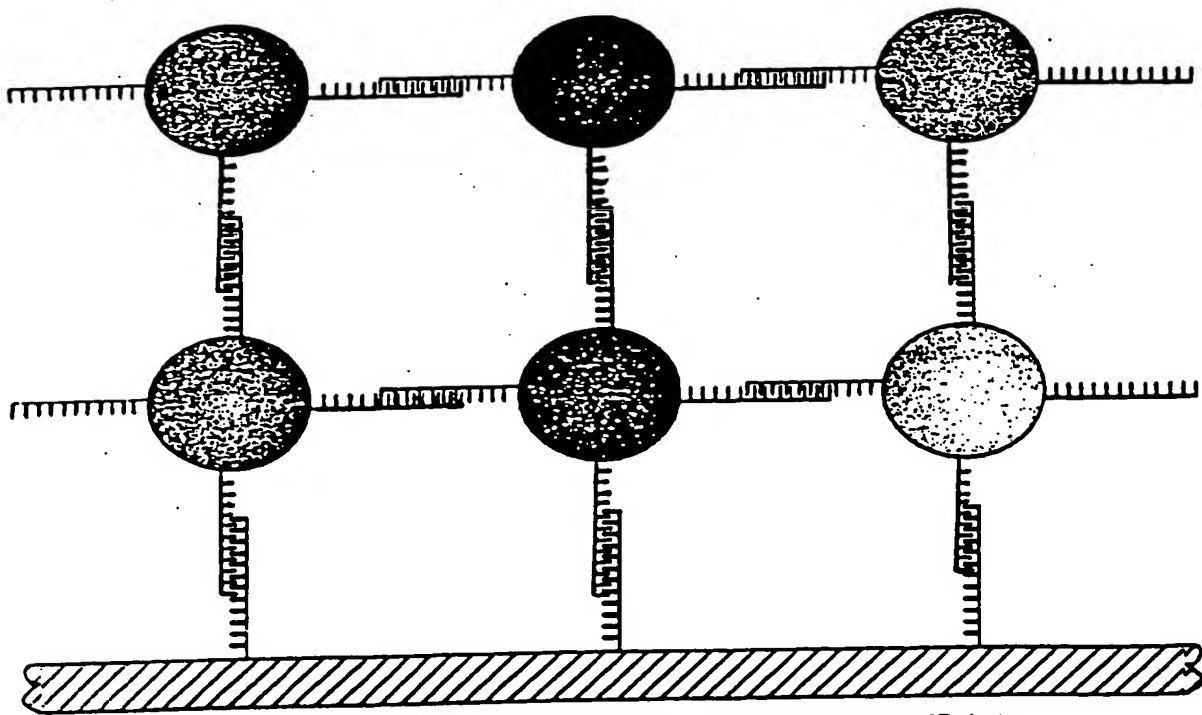


FIG. 35





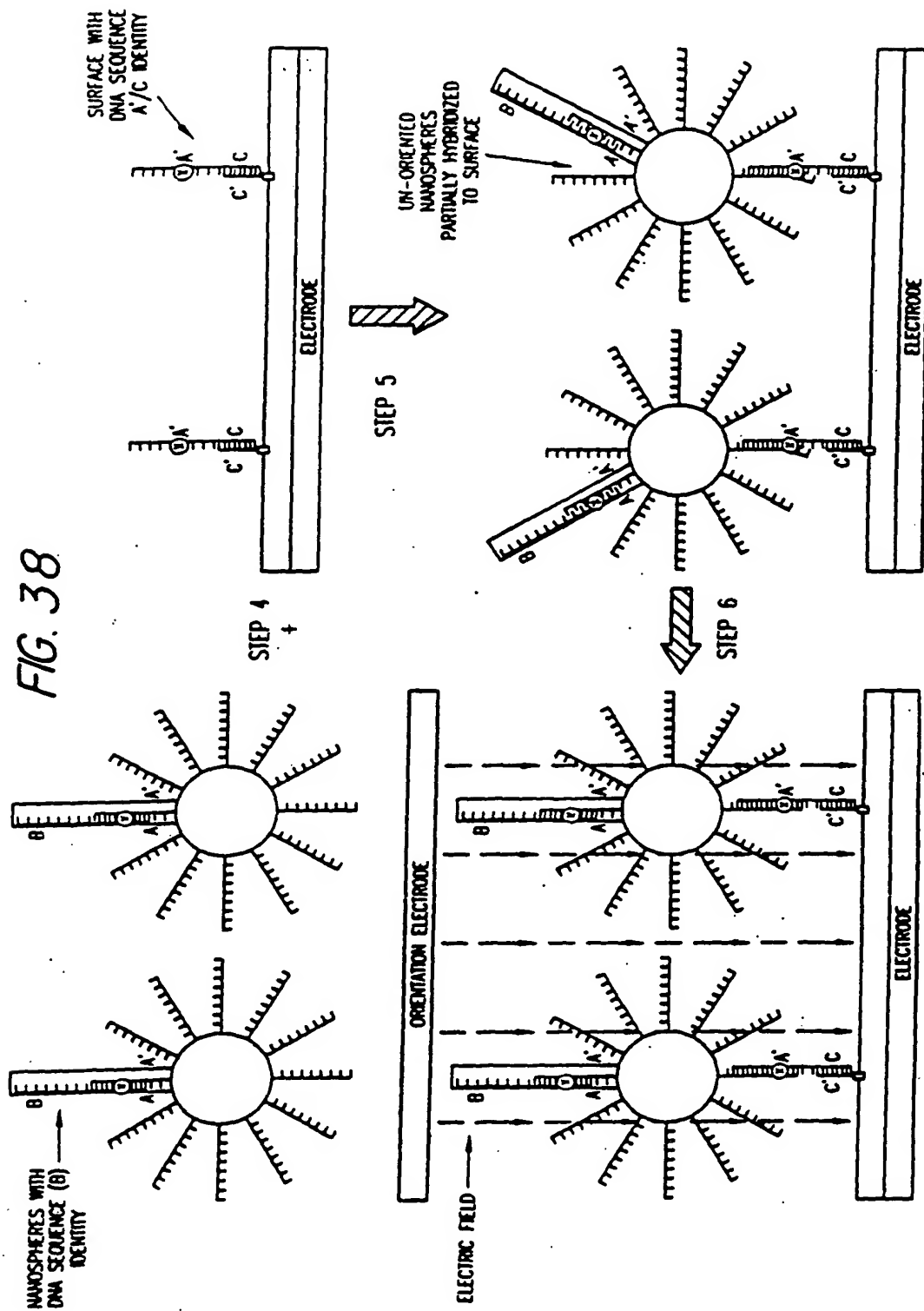
Nanospheres arranged in Octahedron
using 3D DNA nanoconstruction techniques



Nanospheres arranged into lattice structure and bound to surface to create a 3D device

FIG. 36

[illegible]



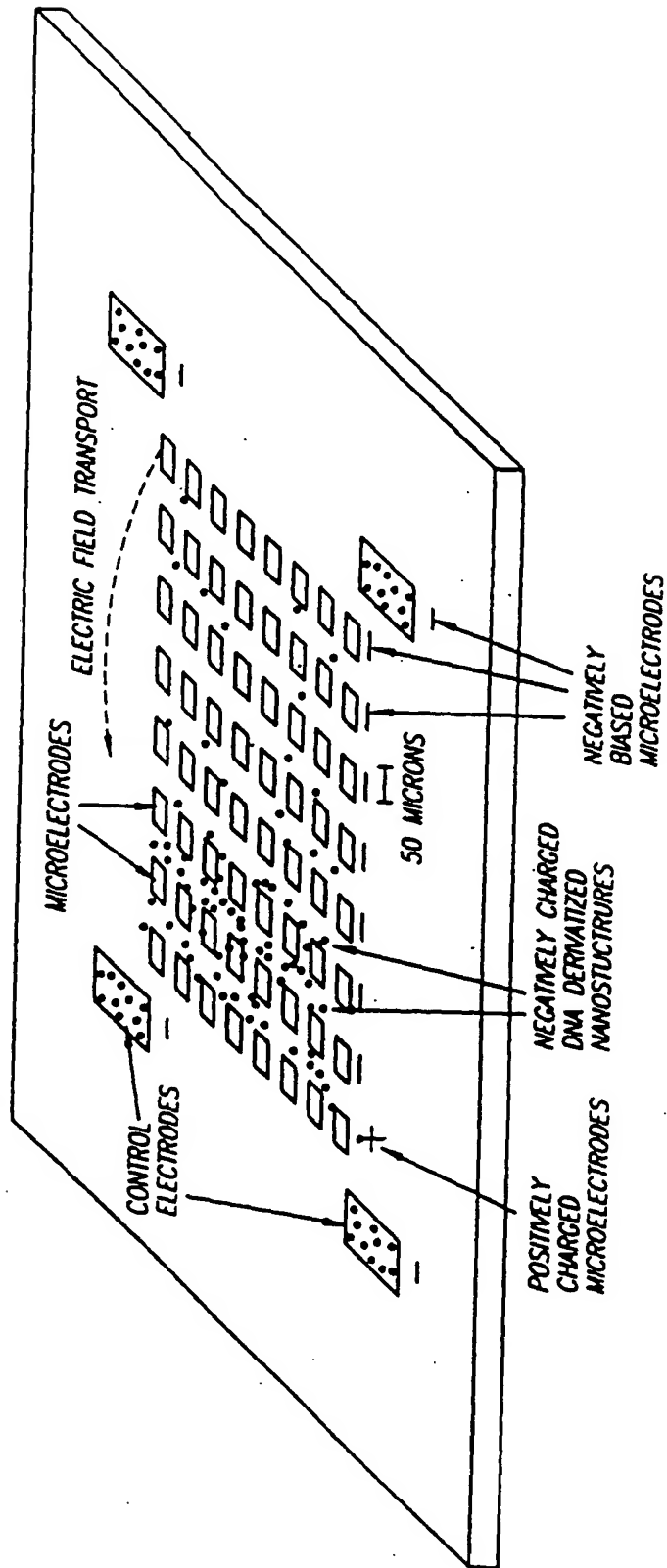
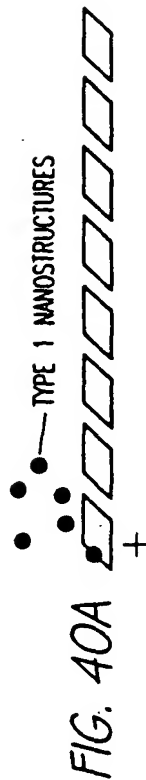


FIG. 39

NEGATIVELY CHARGED TYPE 1 NANOSTRUCTURES
MOVE TOWARD POSITIVELY BIASED MICROLOCATION



TYPE 1 NANOSTRUCTURES ACCUMULATE
ON THE POSITIVELY BIASED MICROLOCATION



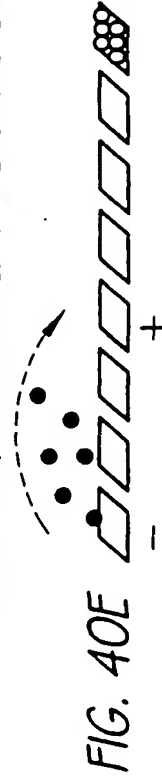
NEGATIVELY CHARGED TYPE 2 NANOSTRUCTURES ARE
INTRODUCED OVER THE ARRAY AND ACCUMULATE
ON THE POSITIVELY BIASED MICROLOCATIONS



BOTH TYPE 1 AND TYPE 2 NANOSTRUCTURES ARE NOW
CLUSTERED ONTO THEIR RESPECTIVE MICROLOCATIONS



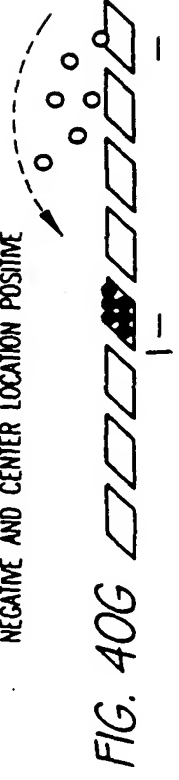
ELECTRONICALLY ASSISTED SELF-ASSEMBLY BEGINS WHEN
MICROLOCATION #1 IS BIASED NEGATIVE AND A CENTER
MICROLOCATION IS BIASED POSITIVE CAUSING THE NEGATIVELY
CHARGED TYPE 1 NANOSTRUCTURES TO MOVE TO CENTER LOCATION



TYPE 1 NANOSTRUCTURES ACCUMULATE AND
HYBRIDIZE TO THE SPECIFIC MICROLOCATION



TYPE 2 NANOSTRUCTURES ARE MOVED TO CENTER
LOCATION BY BIASING MICROLOCATION #8
NEGATIVE AND CENTER LOCATION POSITIVE



TYPE 2 NANOSTRUCTURES CONTAINING COMPLEMENTARY
DNA SEQUENCE HYBRIDIZE TO TYPE 1 NANOSTRUCTURES



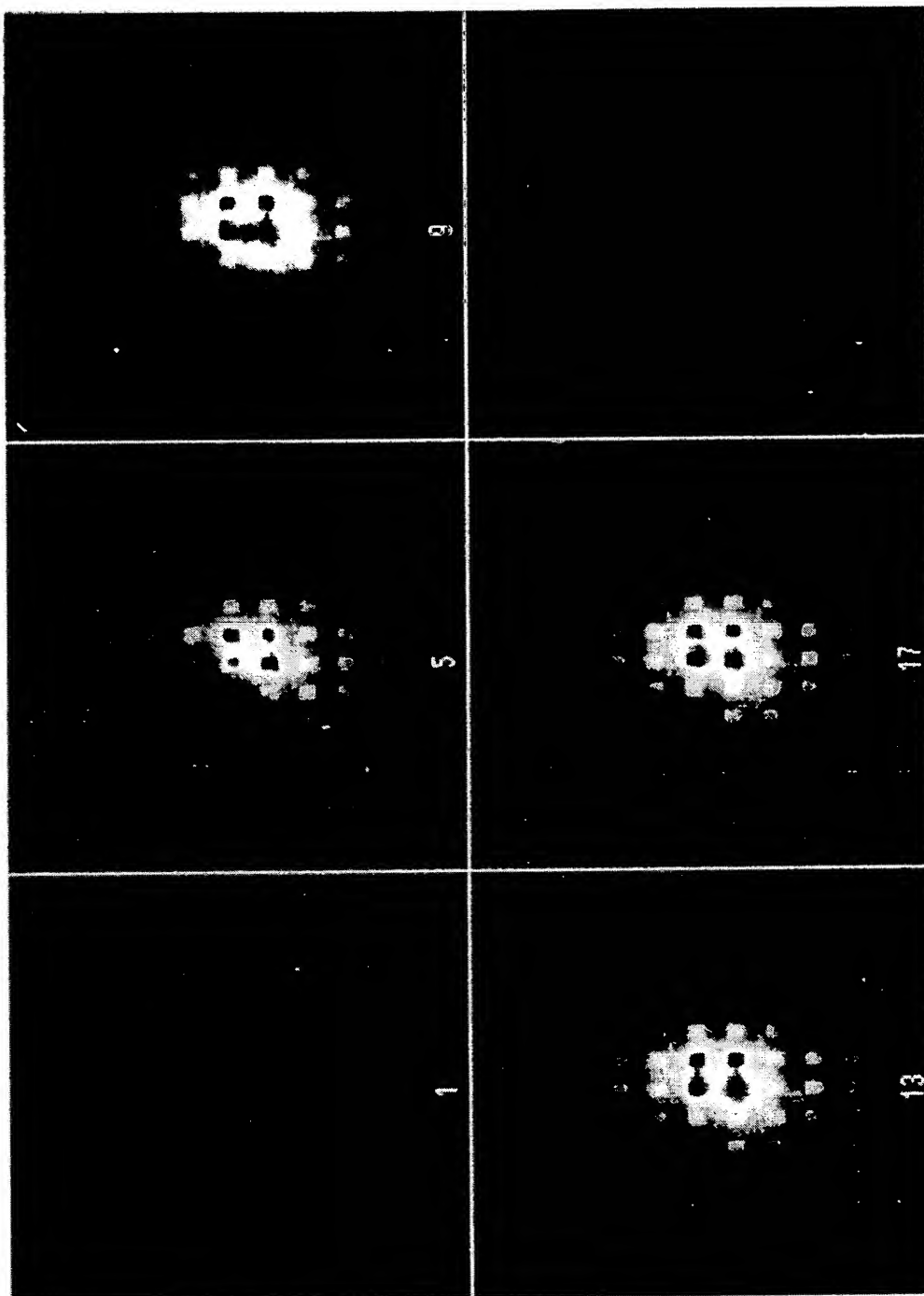
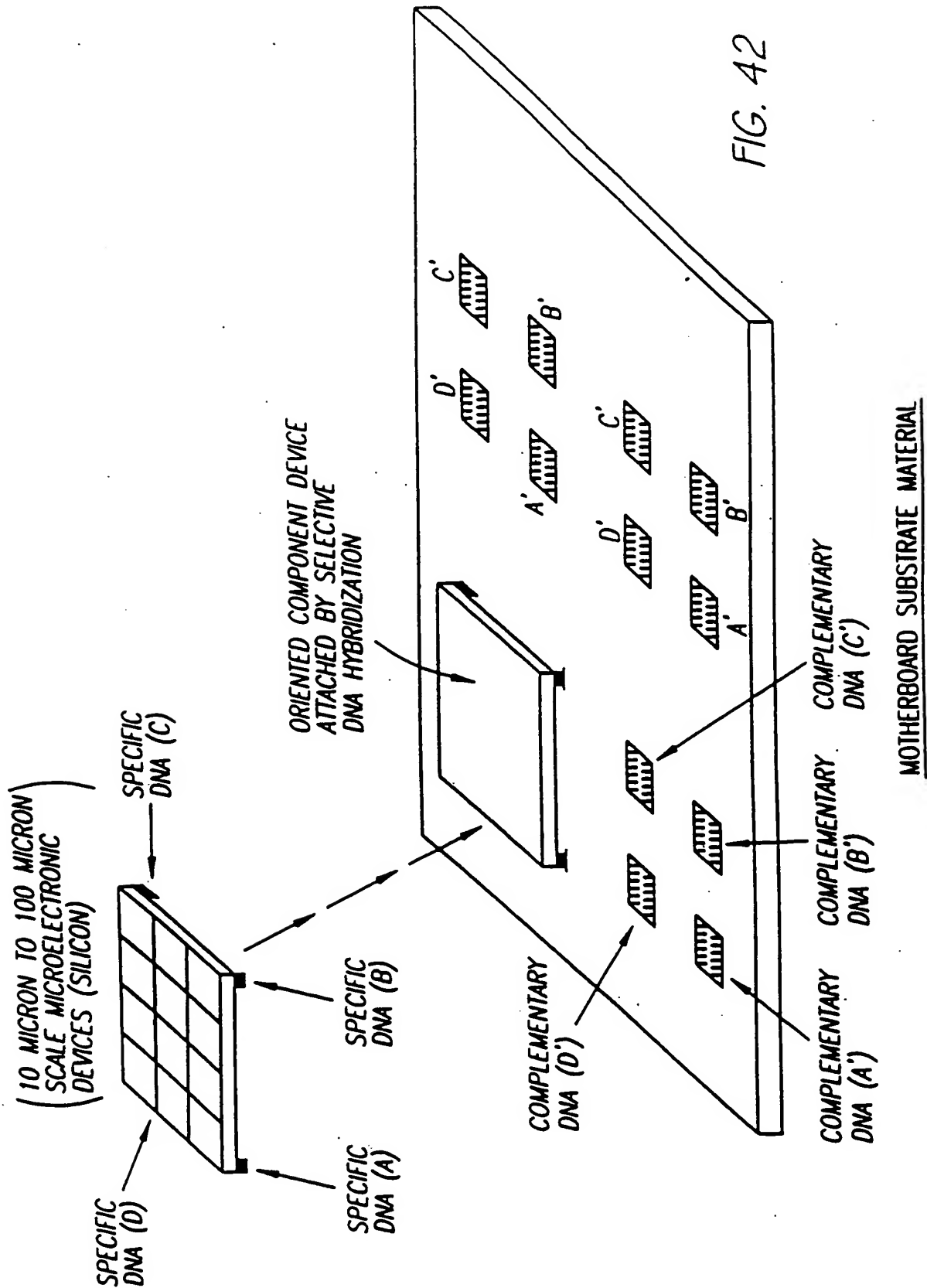


Fig. 41



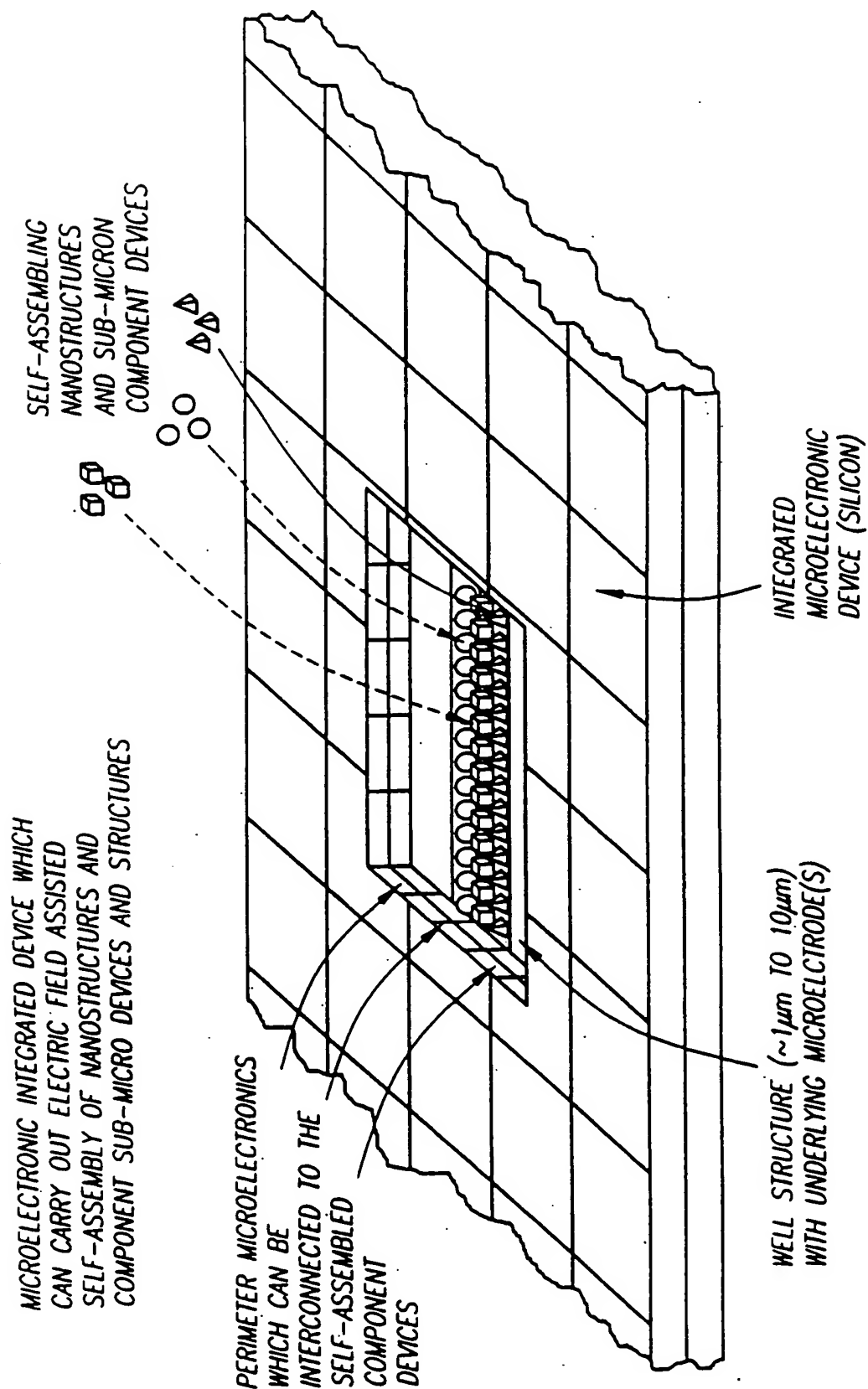


FIG. 43

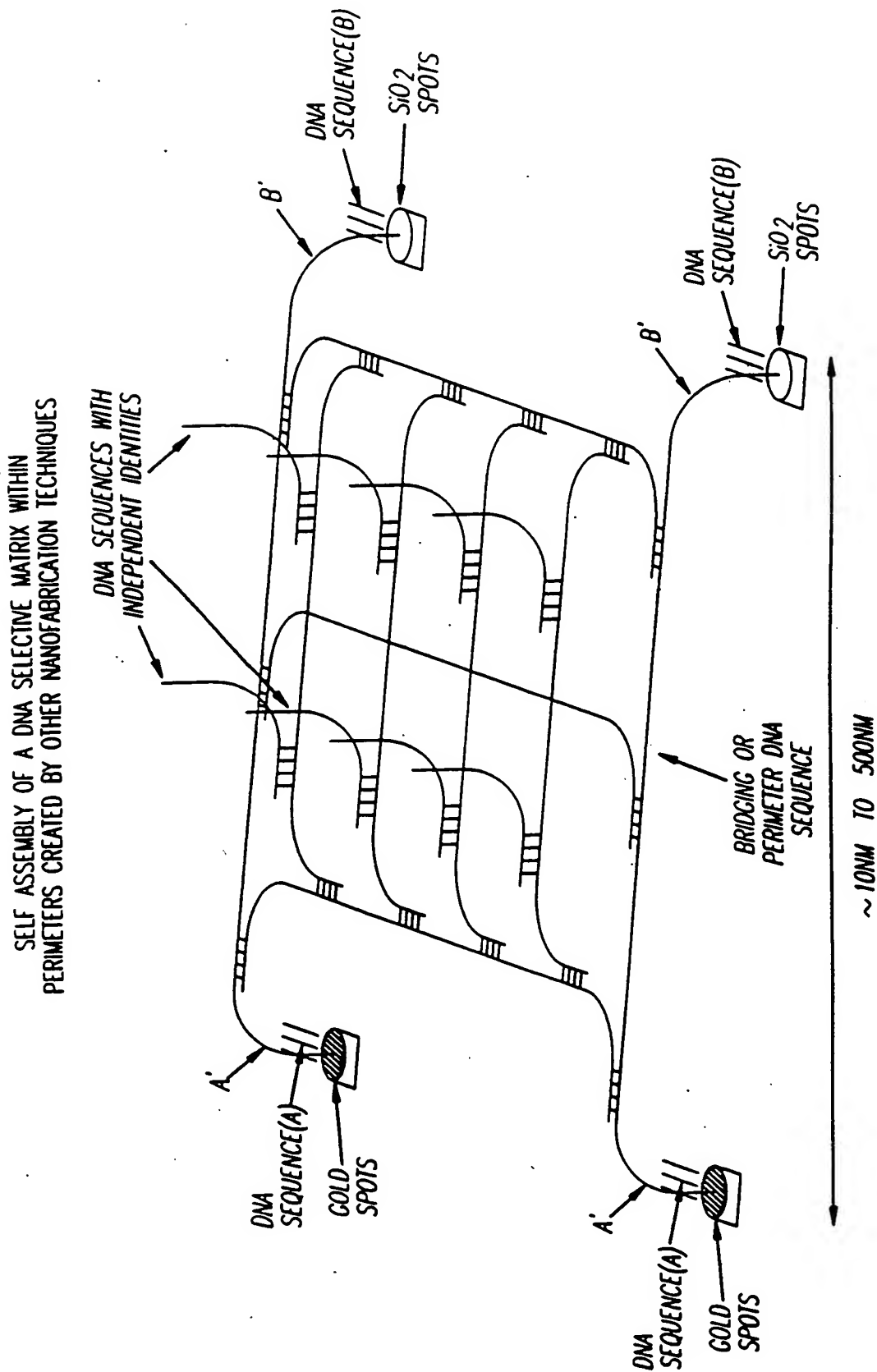


FIG. 44

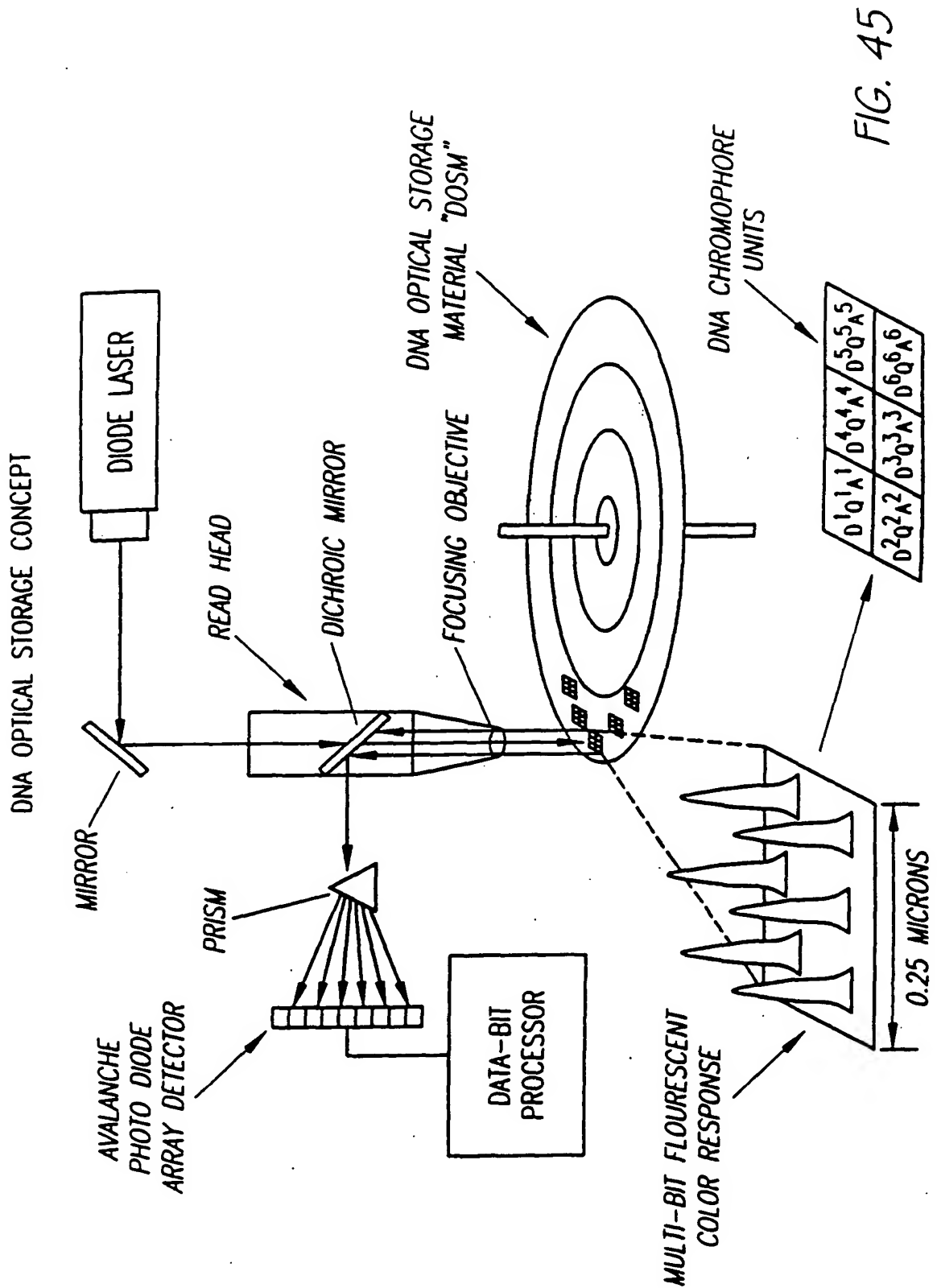


FIG. 45

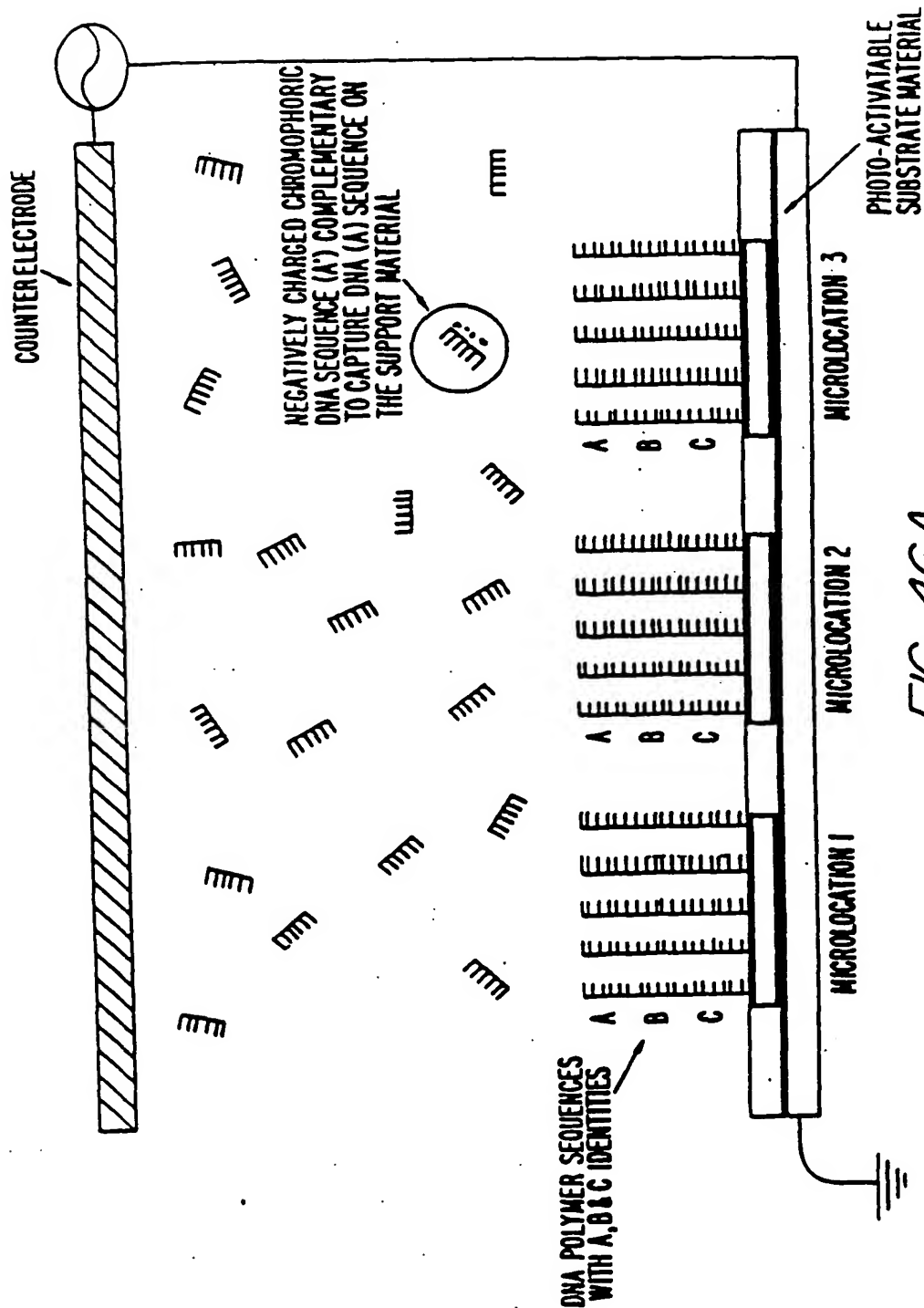
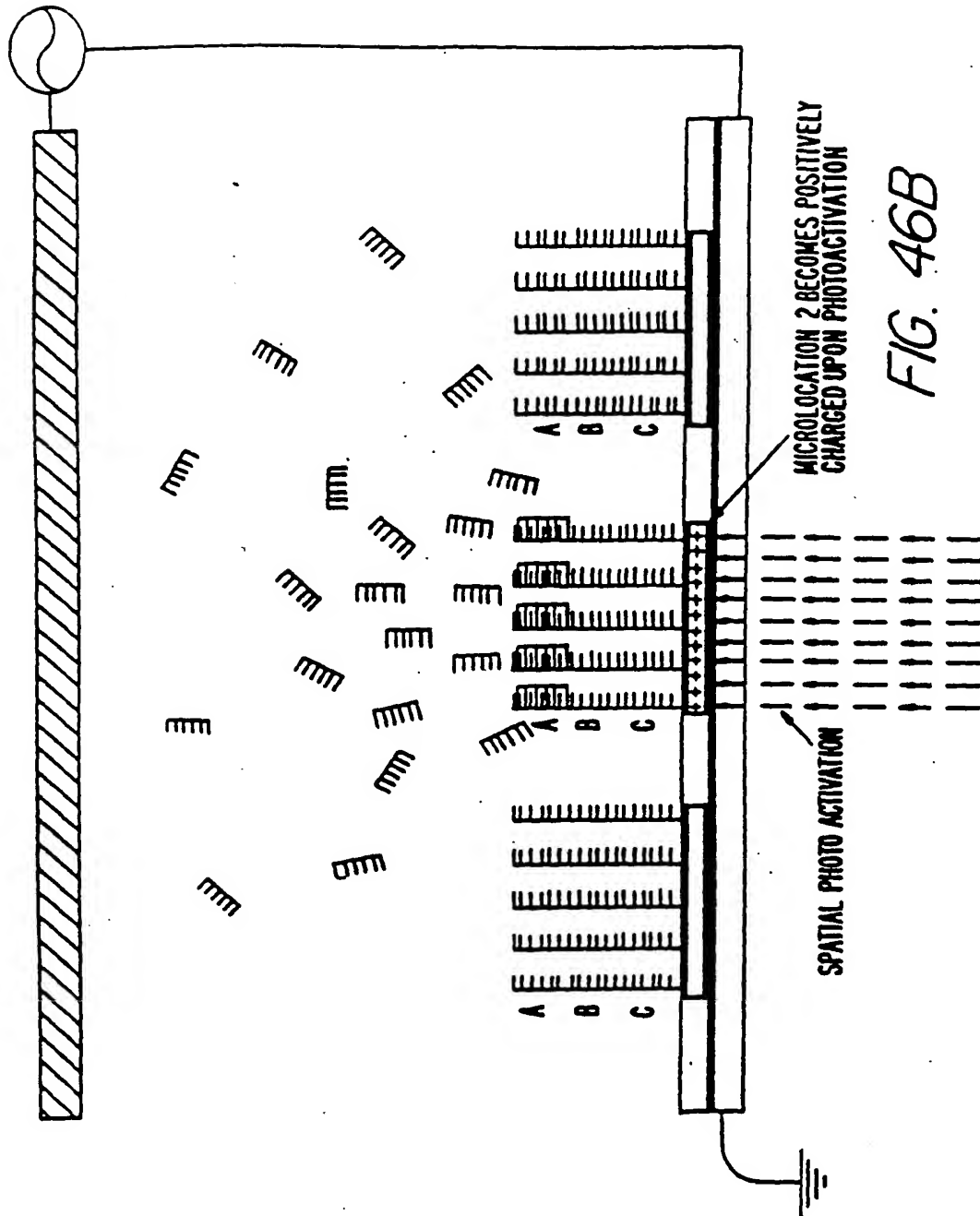
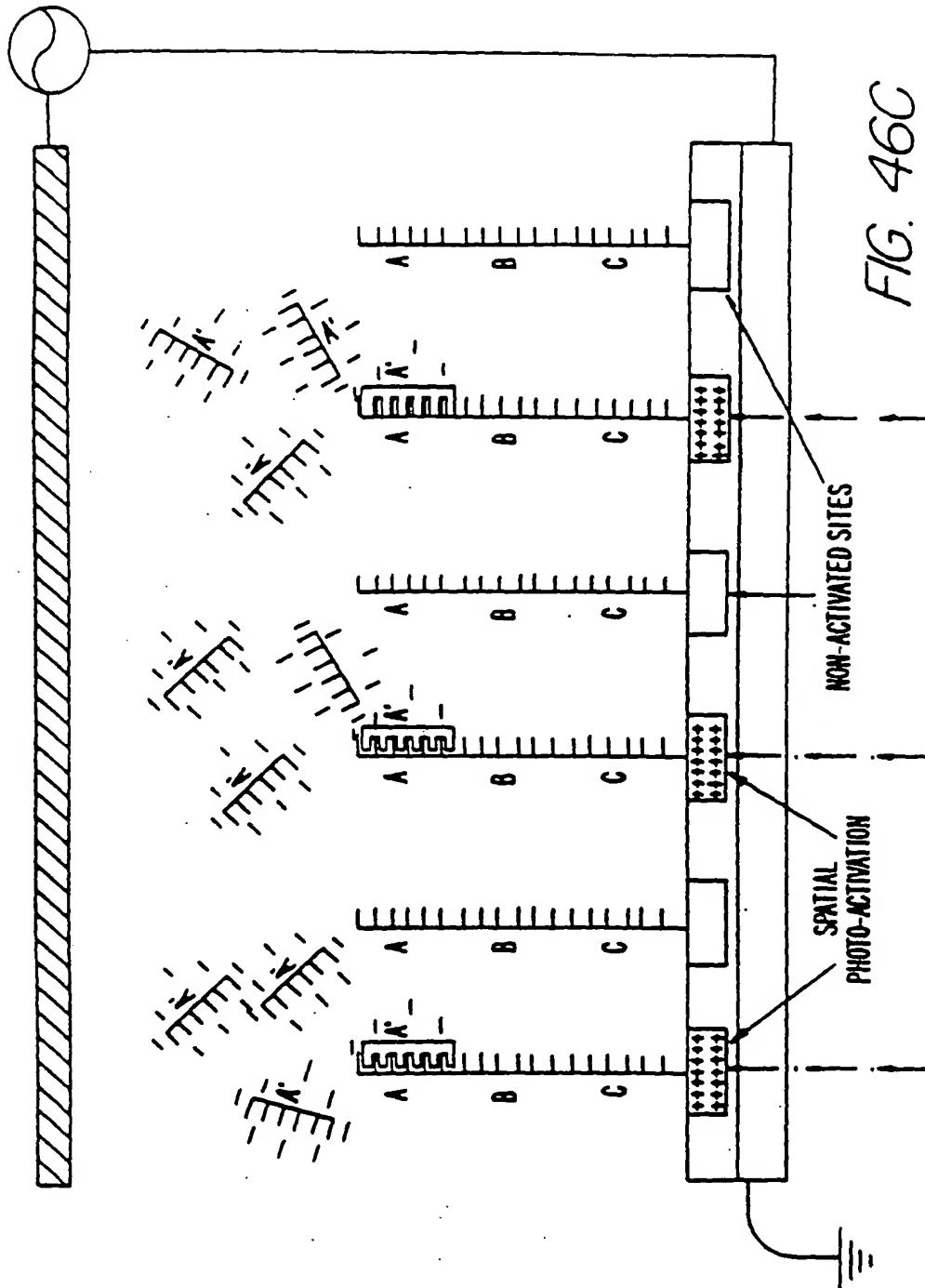
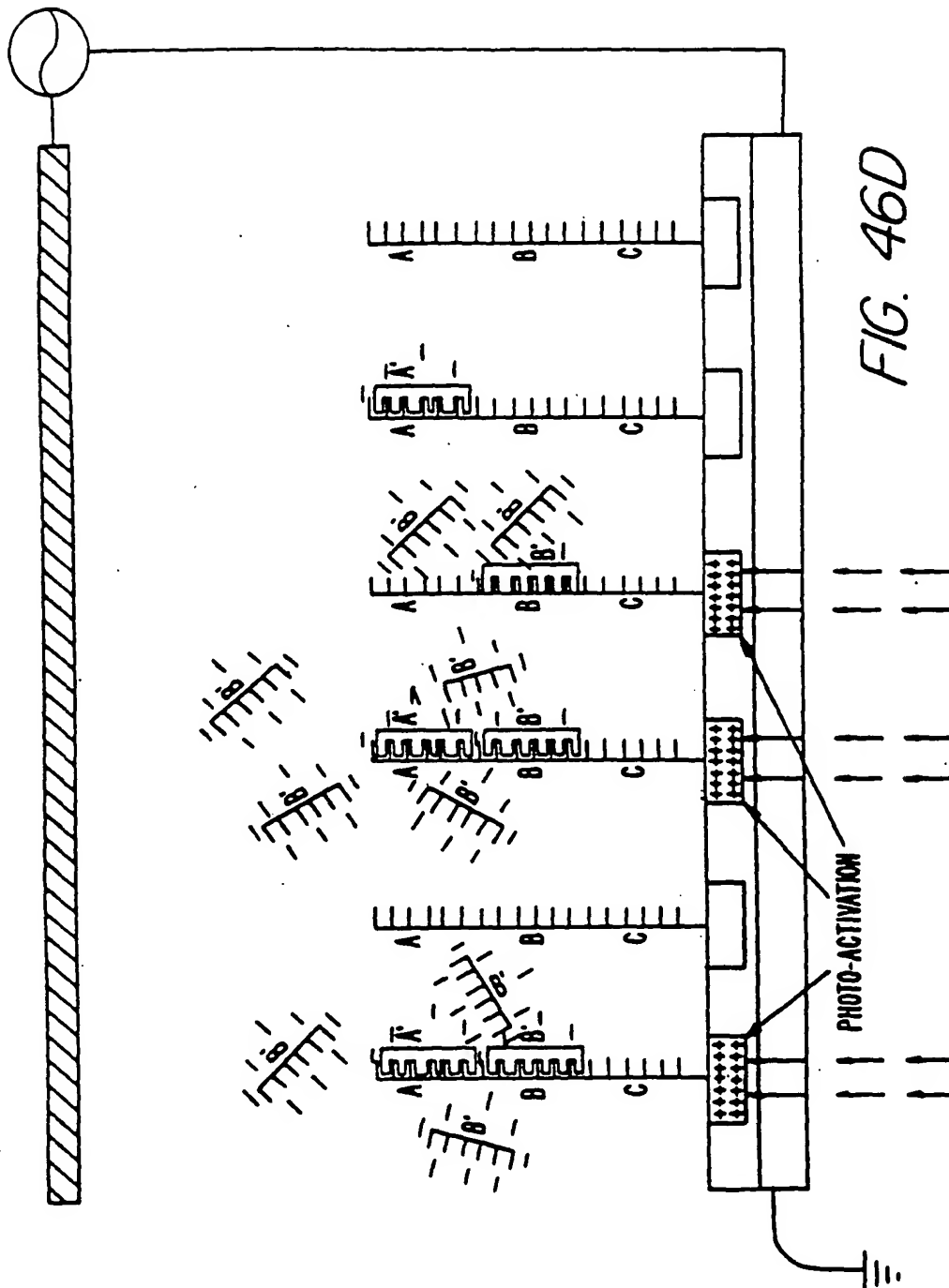


FIG. 46A







The diagram illustrates a photoresistive memory array. It features a grid of memory cells defined by three data lines (A, B, and C) and a word line. The cells are formed by the intersection of these lines. A photoactivation process is shown, where light (represented by arrows) is used to change the resistance of the cells. The diagram includes a power source and a ground connection.

FIG. 46F

SPATIAL LIGHT ADDRESSING PROCESS COMPLETE

